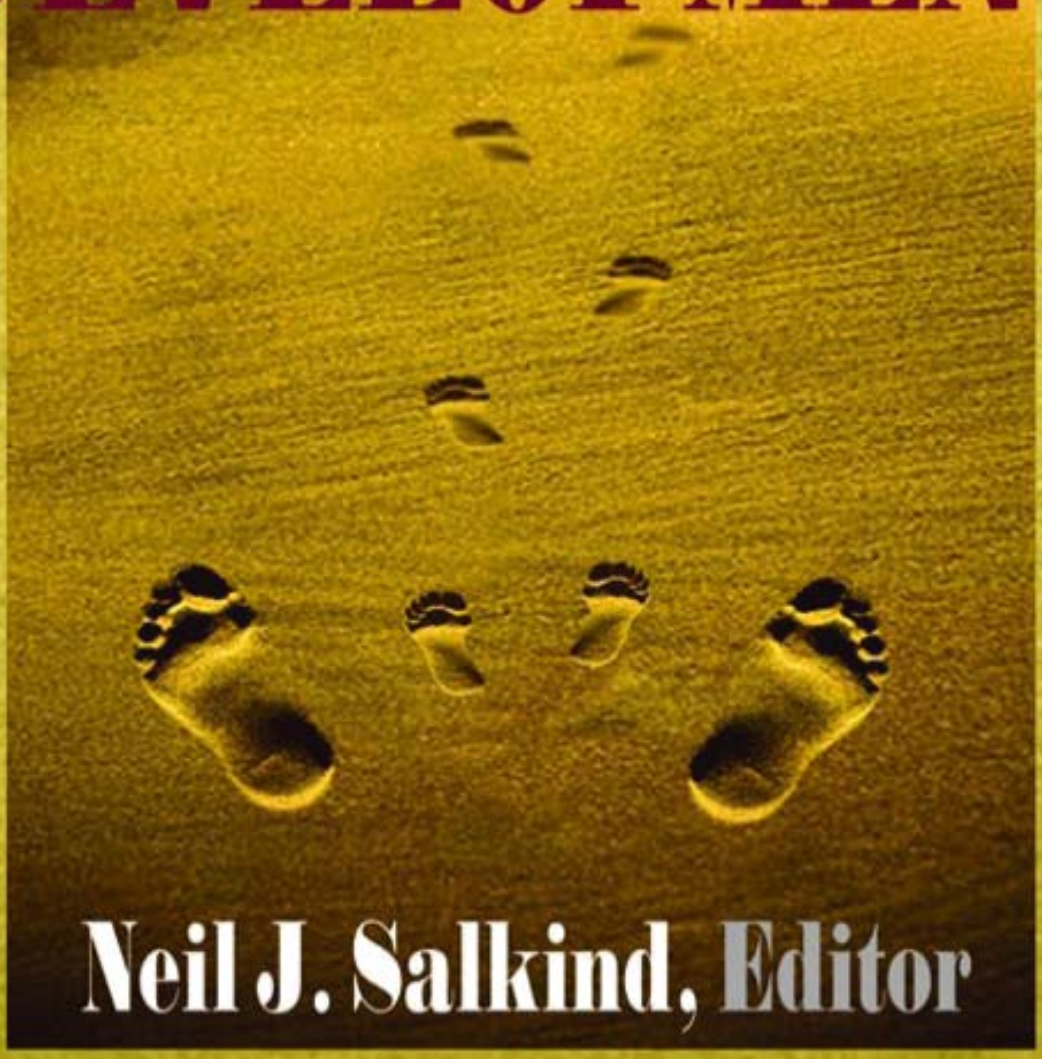
Encyclopedia of HUMAN DEVELOPMENT



Neil J. Salkind, Editor

VISIT…

Encyclopedia of HUMAN DEVELOPMENT

These three volumes are dedicated in the hope that the knowledge gained by exploring the topics within these pages can be used to make the world a better, safer, and more peaceful place to live in—and to those lost, from the class of 1964, Weequahic High School, and that interesting and memorable weekend in October of 2004.

Encyclopedia of HUMAN DEVELOPMENT

Editor

Neil J. Salkind

University of Kansas

Associate Editor

Lewis Margolis

University of North Carolina

Managing Editors

Kimberly DeRuyck and Kristin Rasmussen

University of Kansas

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E-mail: order@sagepub.com

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Acquiring Editor:	Jim Brace-Thompson
Editorial Assistant:	Karen Ehrmann
Project Editor:	Tracy Alpern
Proofreaders:	Dennis Webb
	Libby Larson
	Theresa Kay
Typesetter:	C&M Digitals (P) Ltd.
Indexer:	Pamela Van Huss
Cover Designer:	Michelle Kenny

Contents

Editorial Board, *vii*

List of Entries, *ix*

Reader's Guide, *xv*

About the Editor, *xxiii*

Contributors, *xxv*

Preface, *xli*

Entries

Volume I: A–E
1–498

Volume II: F–O
499–950

Volume III: P–Z
951–1346

Appendix 1: Tables and Figures on Selected Aspects of Human Development, *1347*

Appendix 2: Master Bibliography, *1371*

Index, *1477*

Editorial Board

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List of Entries

Abecedarian Research Project
Abortion
Abstract Reasoning
Accommodation
Acquired Immune Deficiency Syndrome (AIDS)
Activities of Daily Living (ADLs)
Activity Theory
Acupuncture
Adaptation
Addiction
Adler, Alfred
Adolescence
Adoption
Advance Directives
African Americans
After-School Programs
Age Discrimination
Ageism
Aggression
Aging
Aging Parents
Aging Well
Ainsworth, Mary Salter
Alcoholics Anonymous
Alcoholism
Alleles
Allergy
Altruism
Alzheimer's Disease
American Academy of Pediatrics
American Association of Retired Persons (AARP)
American Psychological Association
American Psychological Society
American Sign Language (ASL)
Americans with Disabilities Act
Ames, Louise
Amnesia
Amphetamines
Androgyny
Anemia
Anger
Anorexia Nervosa
Anti-Semitism
Antisocial Behavior
Anxiety Disorders
Apgar Score
Apgar, Virginia
Apnea
Applied Behavior Analysis
Aptitude
Aptitude Tests
Arteriosclerosis
Asperger Syndrome
Assimilation
Assisted Living
Assisted Suicide
Asthma
Athletics
Attachment
Attention
Attention Deficit Hyperactivity Disorder (ADHD)
Attention Span
Attitude
Attribution Theory
Authoritarian Parenting Style
Authoritative Parenting Style
Autism
Average Life Expectancy

Babbling
Babinski Reflex
Baby Boomers
Baby Talk
Baltimore Longitudinal Study on Aging
Bandura, Albert
Bar/Bat Mitzvah
Barker, Roger
Battered Child Syndrome
Battered Woman Syndrome
Baumrind, Diana
Bayley, Nancy
Bayley Scales of Infant Development
Bereavement
Bereavement Overload
Berkeley/Oakland Longitudinal Studies
Bilingualism
Binet, Alfred
Binge Drinking
Binge Eating
Biological Clock
Birth Defects
Birth Order
Birth Weight
Birthing Centers
Bisexuality
BMI (Body Mass Index)
Bowlby, John
Brain Death
Brain Development
Brain Lateralization
Brain Plasticity
Brazelton, T. Berry
Breast Cancer
Breathing Reflex
Breech Birth
Bronfenbrenner, Urie
Brown, Roger

Bruner, Jerome
Buddhism
Bulimia Nervosa
Bullying

Cancer
Cardiovascular Disease
Career Development
Case Study
Categorization
Catholicism
Centers for Disease Control
Charter Schools
Child Abuse
Child Care/Day Care
Child Custody
Child Neglect
Child Rearing
Childlessness
Children with Special Health Care Needs (CSHCN)
Children's Rights
Chomsky, Noam
Chromosomes
Chronic Fatigue Syndrome
Chronic Illness
Chronological Age
Circadian Rhythm
Circumcision
Classical Conditioning
Cluster Suicide
Cocaine
Cochlear Implant
Cognitive Development
Cognitive Dissonance
Cognitive Equilibrium
Cognitive Style
Cohabitation
Cohort
Colic
Common Law Marriage
Comorbidity
Competence Versus Performance
Concrete Operational Period
Conduct Disorder
Conflict
Congestive Heart Failure
Congregate Housing
Conscience
Conservation
Continuity and Discontinuity in Development
Contraception
Convergent Thinking
Cooperative Learning
Cooperative Play
Corporal Punishment
Correlation
Cosleeping Arrangements
Courtroom Testimony
Crack Baby Syndrome
Crawling
Creativity
Creutzfeldt-Jakob Disease
Criterion-Referenced Tests
Critical Period
Cross-Cultural Development
Cross-Sectional Research
Crying
Crystallized Intelligence
Cystic Fibrosis

Darwin, Charles
Dating
Deadbeat Dads
Deafness
Death
Death with Dignity
Deductive Reasoning
Deferred Imitation
Delinquency
Dementia
Dependent Variable
Depression
Development
Developmental Direction
Developmental Disabilities
Developmental Psychopathology
Developmental Quotient
Diabetes
Diagnostic and Statistical Manual of Mental Disorders
Dialectical Thought
Dieting
Disasters
Discipline
Disgust
Distance Learning
Divergent Thinking
Divorce
Divorce Mediation
Domestic Violence
Donor Insemination
Down Syndrome
Drug Abuse
Drunk Driving
Dual-Earner Households
Dying
Dynamical Systems
Dyslexia

Early Childhood
Early Intervention Programs
Eating Disorders
Echolalia
Ecological Theory
Ego
Ego Development
Egocentrism
Elder Abuse
Elder Maltreatment
Elder Neglect
Elderhostel Programs
Electra and Oedipal Complexes
Electroencephalogram (EEG)
Embryo
Emerging Adulthood
Emotional Development
Emotional Intelligence
Empathy
Empty Nest
Endocrine Disruptors
English as a Second Language (ESL)
Epilepsy
Equilibration
Erectile Dysfunction
Erikson, Erik
Estrogen
Ethical Standards of Research
Ethnic Cleansing
Ethnic Identity
Ethology
Euthanasia
Executive Functioning
Exercise
Experiment
Experimental Group
Experimental Method

Extended Family
Extinction
Extramarital Sex

Failure to Thrive
False Memories
Family Size
Fathers
Fetal Medicine
Fetus
Fine Motor Control
Fine Motor Development
Firearms
Five-Factor Model of Personality
Five-to-Seven Shift
Flavell, John
Fluid Intelligence
Formal Operational Period
Foster Care
Fragile X Syndrome
Framingham Study
Fraternal Twins
Freud, Sigmund
Friendship
Funerals

Gamete
Gangs
Gardner, Howard
Gateway Drug
Gay Marriages
Gender Differences
Gender Identity
Gender Role Development
Generalizability
Generalized Anxiety Disorder
Generation Gap
Genotype
Gerontological Society of America
Gerontology
Gesell, Arnold
Giftedness
Gilligan, Carol
Gilligan's Theory of Feminine Morality
Glass Ceiling
Grade Retention
Grandparents
Gray Panthers
Gross Motor Development

Habituation
Hall, G. Stanley
Harlow, Harry
Hate Crimes
Head Start
Health Insurance
Hemophilia
Heterosexuality
Hetherington, E. Mavis
High Blood Pressure (Hypertension)
High-Risk Infants
Higher Education
Hispanic Americans
Holocaust
Home Birth
Homicide
Homosexuality
Hope
Hormone Replacement Therapy
Hormones
Hospice
Hot Flashes
Human Genome Project
Human Immunodeficiency Virus (HIV)
Humor
Huntington's Chorea
Hydrocephalus
Hypothesis

Id
Identical Twins
Identity
Ilg, Frances
Imaginary Audience
Imaginary Friend
Imaginary Thinking
Imitation
Immigrants
Immune System
Immunizations
Imprinting
Inborn Errors of Metabolism
Incest
Inclusion/Mainstreaming
Incontinence
Independent Living
Individual Differences
Individualized Education Programs (IEP)
Individuals with Disabilities Education Act (IDEA)
Inductive Reasoning
Infancy
Infant Mortality
Infanticide
Infectious Diseases
Infertility
Information Processing Theory
Inhibitory Control
Injuries
Intellectual Decline
Intelligence
Intergenerational Relationships
Internet
Interracial Marriages
Intimacy
Ionizing Radiation
IQ Tests
Islam

Joint Custody
Judaism
Juvenile Delinquency

Kibbutzism
Kindergarten Readiness
Kinsey Institute
Klinefelter's Syndrome
Kohlberg, Lawrence
Kübler-Ross, Elisabeth

Labor
Language Acquisition Device
Language Development
Later Adulthood
Lead Poisoning
Learned Helplessness
Learning
Learning Disabilities
Lesbians
Lesch-Nyhan Syndrome
Literacy
Locke, John
Locus of Control
Loneliness
Longitudinal Research

Long-Term Memory
Low Birth Weight (LBW)

MADD (Mothers Against Drunk Driving)
Magical Thinking
Malnutrition
Marijuana
Marital Equity
Marriage
Maslow, Abraham
Maternal Health
Maternal Phenylketonuria
Maternal Smoking
Maturation
Mean Length Utterance
Medicare
Memory Failure
Menarche
Menopause
Menstruation
Mental Age
Mental Retardation
Mentor
Meta-Analysis
Metacognition
Methadone
Methylmercury
Middle Adulthood
Midlife Crisis
Midwife
Miscarriage
Montessori Method
Mood Disorders
Moral Development
Moral Reasoning
Mortality
Motivation
Motor Skill Mastering
Mozart Effect
Multiple Births
Multiple Intelligences
Multiple Sclerosis
Myelin
Myopia

National Assessment of Educational Progress (NAEP)
National Center for Education Statistics (NCES)
National Hospice Study
National Institute of Child Health and Human Development (NICHD)
National Vital Statistics Reports
Native Americans
Natural Childbirth
Naturalistic Observation
Nature–Nurture
Neighborhoods
Neonatal Behavioral Assessment Scale
Neonate
Neurotransmitters
New York Longitudinal Study (NYLS)
NICHD Child Care Study
Noble Savage
Noise
Norm-Referenced Tests
Normal Curve (Bell Curve)
Norms
Nursery (Preschool)
Nutrition

Obesity
Object Permanence
Observational Learning
Obsessive-Compulsive Disorder
Older Adulthood
Older Americans Act
Oldest Old Age
Only Children
Operant Conditioning
Oppositional Defiant Disorder (ODD)
Orphans
Osteoarthritis
Osteoporosis
Ovulation

Pain
Palliative Care
Panic Disorder
Parasuicide
Parent-Child Interaction
Parent-Child Relationships
Parent Training
Parenting
Parents Anonymous
Peer Pressure
Peers
Permissive Parenting Style
Perry Preschool Program
Pervasive Developmental Disorders
Pesticides
Pets
Phenotype
Phenylketonuria (PKU)
Phobias
Phonics
Phonological Awareness
Physical Development and Growth
Piaget, Jean
Polychlorinated Biphenyls (PCB)
Positron Emission Tomography (PET)
Postpartum Depression
Posttraumatic Stress Disorder (PTSD)
Poverty
Pregnancy
Prenatal Development
Preoperational Thought
Preschool Years
Preterm Infants
Preventive Medicine
Primary Circular Reactions
Private Speech
Problem Solving
Prosocial Behavior
Prostate Cancer
Psychoanalytic Theory
Psychopathology
Psychopharmacology
Psychosocial Development
Puberty
Public Policy
Punishment

Qualitative Methods
Quantitative Methods
Quasi-Experimental Design
Quinceañera

Rape
Reading
Reciprocal Determinism

Reflexes
Reggio Emilia Childhood Program
Reinforcement
Reliability
Religion
Resiliency
Retention
Retirement
Rett Syndrome
Rh Factor
Rheumatoid Arthritis
Right-to-Die Movement
Ritalin
Rogers, Carl
Rogers, Fred
Rubella (German Measles)

Sampling
SAT
Scaffolding
Schema
Schizophrenia
School
School Dropouts
School Readiness
School Years
Scientific Method
Sears, Robert
Seattle Longitudinal Study
Second Languages
Secure Attachment
Self-Actualization
Self-Concept
Self-Efficacy
Self-Esteem
Self-Fulfilling Prophecy
Semantic Development
Sensation Seeking
Sensitive Period
Sensory Development
Separation Anxiety
Sex Differences
Sex Education
Sexual Abuse
Sexual Activity
Sexually Transmitted Diseases (STDs)
Short-Term Memory
Shyness
Siblings
Single-Parent Family
Single Parents
Skinner, B. F.
Sleep
Smell
Smiling
Social Anxiety Disorder
Social Class
Social Cognition
Social Development
Social Security
Society for Research in Child Development
Sociobiology
Socioeconomic Status
Spanking
Special Needs Children
Stages of Development
Stages of Dying
Stages of Moral Development
Standardized Testing
Statistical Significance
Stepfamilies
Storm and Stress
Strange Situation
Stranger Anxiety
Stress
Stroke
Structural and Functional Brain Imaging
Stuttering
Sucking Behaviors
Sudden Infant Death Syndrome (SIDS)
Suicide
Superego
Surrogate Mothers
Symbolic Play

T Cells
Tabula Rasa
Taste
Tay Sachs Disease
Teenage Pregnancy
Television
Temperament
Teratogen
Testosterone
Thalassemia
Thalidomide
Theories of Aging
Theories of Development
Theory of Mind
Toddlerhood
Toilet Training
Touch
Tourette's Syndrome
Toxoplasmosis
Twin Studies
Twins

Ultrasound
Universal Grammar
U.S. Bureau of the Census
Utopianism

Vaccination
Validity
Very Low Birth Weight (VLBW)
Very Old Age
Video Games
Violence
Visual Cliff
Vitamin Deficiency
Volunteering
Vygotsky, Lev

Watson, John B.
Wechsler Adult Intelligence Scale (WAIS)
Wechsler Intelligence Scale for Children (WISC)
Weight
Well-Baby Checkup
Whole Language
Widowhood and Widowerhood
Wisdom
Work
World Health Organization
Wright, John C.

Young Adulthood

Zone of Proximal Development (ZPD)
Zygote

Reader's Guide

ABUSE

Battered Child Syndrome
Battered Woman Syndrome
Child Abuse
Child Neglect
Elder Abuse
Elder Neglect
Elder Maltreatment
Incest
Rape
Sexual Abuse

ADOLESCENCE

Adolescence
Dating
Delinquency
Gangs
Juvenile Delinquency
Storm and Stress
Teenage Pregnancy

AGING AND OLDER DEVELOPMENT

Activities of Daily Living (ADLs)
Advance Directives
Age Discrimination
Ageism
Aging
Aging Parents
Aging Well
Assisted Living
Average Life Expectancy
Baltimore Longitudinal Study on Aging
Berkeley/Oakland Longitudinal Studies
Chronological Age
Dementia
Elder Abuse
Elder Maltreatment
Elder Neglect
Generation Gap
Gerontology
Older Adulthood
Stroke
Theories of Aging
Very Old Age
Widowhood and Widowerhood
Wisdom

BIOGRAPHIES

Adler, Alfred
Ainsworth, Mary Salter
Ames, Louise
Apgar, Virginia
Bandura, Albert
Barker, Roger
Baumrind, Diane
Bayley, Nancy
Binet, Alfred
Bowlby, John
Brazelton, T. Berry
Bronfenbrenner, Urie
Brown, Roger
Bruner, Jerome
Chomsky, Noam
Darwin, Charles
Erikson, Erik
Flavell, John
Freud, Sigmund
Gardner, Howard
Gesell, Arnold
Gilligan, Carol

Hall, G. Stanley
Harlow, Harry
Hetherington, E. Mavis
Ilg, Frances
Kohlberg, Lawrence
Kübler-Ross, Elisabeth
Locke, John
Maslow, Abraham
Piaget, Jean
Rogers, Carl
Rogers, Fred
Sears, Robert
Skinner, B. F.
Vygotsky, Lev
Watson, John B.
Wright, John C.

BIRTH AND INFANCY

Apgar Score
Attachment
Babinski Reflex
Bayley Scales of Infant Development
Birth Defects
Birth Order
Birth Weight
Birthing Centers
Breech Birth
Circumcision
Colic
Crying
Donor Insemination
Dynamical Systems
Embryo
Fetal Medicine
Fetus
Fraternal Twins
Gamete
High Risk Infants
Home Birth
Identical Twins
Immunizations
Infancy
Infant Mortality
Infertility
Labor
Low Birth Weight (LBW)
Maternal Health
Maternal Phenylketonuria
Maternal Smoking
Midwife
Miscarriage
Multiple Births
Natural Childbirth
Neonatal Behavioral Assessment Scale
Neonate
Ovulation
Pesticides
Phenylketonuria (PKU)
Pregnancy
Prenatal Development
Preterm Infants
Secure Attachment
Stranger Anxiety
Sucking Behaviors
Sudden Infant Death Syndrome (SIDS)
Twins
Ultrasound
Very Low Birth Weight (VLBW)

COGNITIVE DEVELOPMENT

Abstract Reasoning
Accommodation
Adaptation
Assimilation
Attention
Attention Span
Categorization
Cognitive Development
Cognitive Dissonance
Cognitive Equilibrium
Cognitive Style
Concrete Operational Period
Conservation
Convergent Thinking
Creativity
Deductive Reasoning
Dialectical Thought
Divergent Thinking
Egocentrism
Equilibration
Executive Functioning
Five-to-Seven Shift
Formal Operational Period
Habituation
Humor
Imaginary Audience
Imaginary Friend
Imaginary Thinking
Inductive Reasoning
Information Processing Theory

Magical Thinking
Metacognition
Moral Development
Object Permanence
Preoperational Thought
Primary Circular Reactions
Scaffolding
Schema
Sensory Development
Social Cognition
Stages of Development
Stages of Moral Development
Theory of Mind
Zone of Proximal Development (ZPD)

DEATH AND DYING

Assisted Suicide
Bereavement
Bereavement Overload
Brain Death
Death
Death with Dignity
Dying
Euthanasia
Funerals
Hospice
Infanticide
Mortality
National Hospice Study
Palliative Care
Parasuicide
Right-to-Die Movement
Stages of Dying

EARLY CHILDHOOD DEVELOPMENT AND EDUCATION

Abecedarian Research Project
Child Care/Day Care
Early Childhood
Early Intervention Programs
Failure to Thrive
Head Start
Kindergarten Readiness
Mozart Effect
NICHD Child Care Study
Noble Savage
Nursery (Preschool)
Perry Preschool Program
Preschool Years
Reggio Emilia Childhood Program
Resiliency
Toddlerhood
Toilet Training

EDUCATION

After-School Programs
Charter Schools
Competence Versus Performance
Distance Learning
Giftedness
Grade Retention
Higher Education
Individualized Education Programs (IEP)
Literacy
Montessori Method
Motivation
National Assessment of Educational Progress (NAEP)
National Center for Educational Statistics
Reading
SAT
School
School Dropouts
School Readiness
School Years
Sex Education

FAMILIES, FAMILY DEVELOPMENT, AND PARENTING

Adoption
Authoritarian Parenting Style
Authoritative Parenting Style
Child Custody
Child Rearing
Childlessness
Common Law Marriage
Congregate Housing
Corporal Punishment
Cosleeping Arrangements
Deadbeat Dads
Discipline
Divorce
Divorce Mediation
Domestic Violence
Dual-Earner Households
Empty Nest
Extended Family
Family Size
Fathers

Foster Care
Gay Marriages
Glass Ceiling
Grandparents
Intergenerational Relationships
Interracial Marriages
Joint Custody
Kibbutzim
Marital Equity
Marriage
Only Children
Orphans
Parent-Child Interaction
Parent-Child Relationships
Parent Training
Parenting
Parents Anonymous
Permissive Parenting Style
Poverty
Siblings
Single-Parent Family
Single Parents
Spanking
Stepfamilies
Surrogate Mothers

GENETICS/GENETIC TESTING

Alleles
Chromosomes
Fragile X Syndrome
Human Genome Project
Phenotype

HEALTH AND WELL-BEING

Abortion
Acquired Immune Deficiency Syndrome (AIDS)
Acupuncture
Addiction
Allergy
Alzheimer's Disease
Anemia
Apnea
Arteriosclerosis
Asthma
Breast Cancer
Cancer
Cardiovascular Disease
Chronic Fatigue Syndrome
Chronic Illness
Congestive Heart Failure
Creutzfeldt-Jakob Disease
Cystic Fibrosis
Deafness
Diabetes
Dieting
Disasters
Endocrine Disruptors
Epilepsy
Estrogen
Firearms
Health Insurance
Hemophilia
High Blood Pressure (Hypertension)
Homicide
Human Immunodeficiency Virus (HIV)
Huntington's Chorea
Hydrocephalus
Immune System
Inborn Errors of Metabolism
Incontinence
Infectious Diseases
Ionizing Radiation
Klinefelter's Syndrome
Lead Poisoning
Lesch-Nyhan Syndrome
Malnutrition
Methylmercury
Multiple Sclerosis
Noise
Nutrition
Obesity
Osteoarthritis
Osteoporosis
Polychlorinated Biphenyls (PCB)
Positron Emission Tomography (PET)
Preventive Medicine
Prostate Cancer
Reflexes
Rett Syndrome
Rh Factor
Rheumatoid Arthritis
Rubella (German Measles)
Sexually Transmitted Diseases (STDs)
Structural and Functional Brain Imaging
T Cells
Tay Sachs Disease
Teratogen
Testosterone

Thalassemia
Thalidomide
Tourette's Syndrome
Toxoplasmosis
Vaccination
Vitamin Deficiency
Weight
Well-Baby Checkup

INTELLIGENCE, ABILITY, AND APTITUDE

Aptitude
Aptitude Tests
Crystallized Intelligence
Developmental Quotient
Emotional Intelligence
Fluid Intelligence
Intellectual Decline
Intelligence
IQ Tests
Mental Age
Multiple Intelligences
Wechsler Adult Intelligence Scale (WAIS)
Wechsler Intelligence Scale for Children (WISC)

LANGUAGE AND COMMUNICATIONS

American Sign Language (ASL)
Babbling
Baby Talk
Bilingualism
Echolalia
English as a Second Language (ESL)
Language Acquisition Device
Language Development
Mean Length Utterance
Phonics
Phonological Awareness
Private Speech
Second Languages
Semantic Development
Stuttering
Universal Grammar
Whole Language

LAWS AND POLICIES

Americans with Disabilities Act (ADA)
Children with Special Health Care Needs (CSHCN)
Children's Rights
Courtroom Testimony
Inclusion/Mainstreaming
Individuals with Disabilities Education Act (IDEA)
Medicare
Older Americans Act
Public Policy
Social Security

LEARNING AND MEMORY

Amnesia
Classical Conditioning
Dyslexia
Extinction
False Memories
Inhibitory Control
Learning
Learning Disabilities
Long-Term Memory
Memory Failure
Operant Conditioning
Problem Solving
Punishment
Reinforcement
Retention
Short-Term Memory

MENTAL HEALTH, MENTAL DISORDERS, AND SPECIAL GROUPS

Anorexia Nervosa
Antisocial Behavior
Anxiety Disorders
Asperger Syndrome
Attention Deficit Hyperactivity Disorder (ADHD)
Autism
Binge Drinking
Binge Eating
Bulimia Nervosa
Cluster Suicide
Comorbidity
Conduct Disorder
Depression
Developmental Disabilities
Developmental Psychopathology
Down Syndrome
Eating Disorders
Generalized Anxiety Disorder
Independent Living
Mental Retardation
Mood Disorders

Obsessive-Compulsive Disorder
Oppositional Defiant Disorder (ODD)
Panic Disorder
Pervasive Developmental Disorders
Phobias
Post Traumatic Stress Disorder (PTSD)
Postpartum Depression
Psychopathology
Ritalin
Schizophrenia
Social Anxiety Disorder
Special Needs Children
Suicide

MIDDLE AND YOUNG ADULTHOOD

Baby Boomers
Middle Adulthood
Young Adulthood

OLDER ADULTHOOD AND OLD AGE

Elderhostel Programs
Gray Panthers
Oldest Old Age
Retirement

PERSONALITY

Anger
Attribution Theory
Five-Factor Model of Personality
Hope
Identity
Individual Differences
Self-Actualization
Self-Concept
Shyness
Temperament

PHYSICAL AND BIOLOGICAL DEVELOPMENT

Activity Theory
Athletics
Biological Clock
BMI (Body Mass Index)
Brain Development
Brain Lateralization
Brain Plasticity
Breathing Reflex
Circadian Rhythm
Cochlear Implant
Crawling
Electroencephalogram (EEG)
Exercise
Fine Motor Control
Fine Motor Development
Gross Motor Development
Hormone Replacement Therapy
Hormones
Hot Flashes
Maturation
Menarche
Menopause
Menstruation
Motor Skill Mastering
Myelin
Myopia
Neurotransmitters
Pain
Physical Development and Growth
Psychopharmacology
Puberty
Sensation Seeking
Self-Esteem
Sexual Activity
Sleep
Smell
Taste
Touch

PROFESSIONAL ORGANIZATIONS AND PUBLICATIONS

American Academy of Pediatrics
American Association of Retired Persons (AARP)
American Psychological Association
American Psychological Society
Centers for Disease Control
Gerontological Society of America
MADD (Mothers Against Drunk Driving)
National Institute of Child Health and Human Development (NICHD)
National Vital Statistics Reports
Society for Research in Child Development
World Health Organization

RACE, RELIGION, AND ETHNICITY

African Americans
Anti-Semitism
Buddhism

Catholicism
Ethnic Cleansing
Ethnic Identity
Hate Crimes
Hispanic Americans
Holocaust
Immigrants
Islam
Judaism
Native Americans
Religion

SEXUALITY AND SEX

Bisexuality
Contraception
Erectile Dysfunction
Extramarital Sex
Heterosexuality
Homosexuality
Intimacy
Kinsey Institute
Lesbians

SOCIAL DEVELOPMENT AND SOCIAL BEHAVIOR

Aggression
Altruism
Androgyny
Attitude
Bar/Bat Mitzvah
Bullying
Career Development
Cohabitation
Conflict
Cooperative Learning
Cooperative Play
Cross-Cultural Development
Disgust
Emerging Adulthood
Empathy
Friendship
Gender Differences
Gender Identity
Gender Role Development
Gilligan's Theory of Feminine Morality
Later Adulthood
Learned Helplessness
Locus of Control
Loneliness
Mentor
Midlife Crisis
Moral Reasoning
Neighborhoods
Peer Pressure
Peers
Pets
Prosocial Behavior
Psychosocial Development
Quinceañera
Self-Fulfilling Prophecy
Sex Differences
Smiling
Social Class
Social Development
Socioeconomic Status
Strange Situation
Stress
Symbolic Play
Television
Video Games
Violence
Volunteering
Work

STATISTICS, RESEARCH METHODS, AND MEASUREMENT

Case Study
Cohort
Correlation
Criterion Referenced Tests
Cross-Sectional Research
Dependent Variable
Diagnostic and Statistical Manual of Mental Disorders
Ethical Standards of Research
Experiment
Experimental Group
Experimental Method
Framingham Study
Generalizability
Hypothesis
Internet
Longitudinal Research
Meta-Analysis
Naturalistic Observation
New York Longitudinal Study (NYLS)
Norm-Referenced Tests
Normal Curve (Bell Curve)
Norms

Observational Learning
Qualitative Methods
Quantitative Methods
Quasi-Experimental Design
Reliability
Sampling
Scientific Method
Seattle Longitudinal Study
Standardized Testing
Statistical Significance
Twin Studies
Validity
Visual Cliff

SUBSTANCE ABUSE

Alcoholics Anonymous
Alcoholism
Amphetamines
Cocaine
Crack Baby Syndrome
Drug Abuse
Drunk Driving
Gateway Drug
Marijuana
Methadone

THEORIES AND IDEAS ABOUT DEVELOPMENT

Applied Behavior Analysis
Conscience
Continuity and Discontinuity in Development
Critical Period
Deferred Imitation
Development
Developmental Direction
Ecological Theory
Ego
Ego Development
Electra and Oedipal Complexes
Ethology
Id
Imitation
Imprinting
Nature–Nurture
Psychoanalytic Theory
Reciprocal Determinism
Self-Efficacy
Sensitive Period
Separation Anxiety
Sociobiology
Superego
Tabula Rasa
Theories of Development
Utopianism

About the Editor

Neil J. Salkind (PhD, University of Maryland, 1973) is a Professor of Psychology and Research in Education at the University of Kansas in Lawrence, Kansas. He completed postdoctoral training as a member of the Bush Child and Family Policy Institute at the University of North Carolina in 1980 and has authored and coauthored more than 125 scholarly papers and books. He is author most recently of *Theories of Human Development* (2003) and *Statistics for People Who Think They Hate Statistics* (2003), both published by Sage. He was the editor of *Child Development Abstracts and Bibliography*, published by the Society for Research in Child Development (SRCD), from 1988 through 2001 and continues to be active in that organization as a member of various committees.

Contributors

Abar, Beau
George Mason University

Abrams, Lise
University of Florida

Acitelli, Linda K.
University of Houston

Ackerman, John P.
University of Delaware

Adams, Gary A.
University of Wisconsin Oshkosh

Adams, Mary Ann
University of Southern Mississippi

Adkins, Paula M.
University of Colorado at Colorado Springs

Affeld, J'Anne
Northern Arizona University

Alcantara, Adriana A.
University of Texas at Austin

Aldrich, Naomi
City University of New York, Brooklyn College

Alejano-Steele, AnnJanette
Metropolitan State College

Alexander, Duane
National Institute of Child Health and Human Development, National Institutes of Health

Allen, Lacy
University of Central Florida

Allen, LaRue
New York University

Altmann, Lori J. P.
Malcolm Randall Veterans Affairs Medical Center, Brain Research Center University of Florida

Altus, Deborah E.
Washburn University

America, Alison
University of Hartford

Amory, John K.
University of Washington

Anderson, Craig A.
Iowa State University

Anderson, David I.
San Francisco State University

Anderson, Kathryn B.
Our Lady of the Lake University

Anderson, Pamela M.
Tufts University

Anderson, Robert N.
Centers for Disease Control and Prevention

Appel, James B.
University of South Carolina

Appelhans, Bradley
Arizona State University

Archibald, Matthew E.
Emory University

Arndt, Jamie
University of Missouri

Astuto, Jennifer
New York University

Attanasio, Roberta
Georgia State University

Aykin-Burns, Nukhet
University of Iowa

Aylsworth, Arthur S.
University of North Carolina at Chapel Hill

Ayotte, Brian J.
West Virginia University

Bailey, Richard
Canterbury Christ Church University College

Bakhurst, David
Queen's University

Balaban, Marie T.
Eastern Oregon University

Barnett, W. Steven
Rutgers University

Barr, Rachel
Georgetown University

Barsky, Robert F.
Vanderbilt University

Barton, John L.
Arizona State University

Bartsch, Karen
University of Wyoming

Bass, Jennifer
The Kinsey Institute

Basso, Michael R.
University of Tulsa

Bateson, Patrick
University of Cambridge

Bauer, David J.
University of Wisconsin–Milwaukee

Bayer, Michelle
University of Central Florida

Beauchamp, Anne S.
University of Kansas

Becker, Gay
University of California, San Francisco

Benigno, Joann P.
University of Florida

Bennett, Kymberley
Indiana State University

Bennett, Trude
University of North at Carolina at Chapel Hill

Benson, Eric
University of Kansas

Benson, Janette B.
University of Denver

Berger, Lauren
University of Denver

Berntson, Gary G.
The Ohio State University

Bhatia, Tej K.
Syracuse University

Bickham, David S.
Children's Hospital Boston/Harvard Medical School

Bjorklund, David F.
Florida Atlantic University

Blanton, Priscilla W.
University of Tennessee

Bleich, J. David
Yeshiva University

Blount-Matthews, Kirsten M.
University of California, Berkeley

Bonner, Melanie J.
Duke University

Bonvillian, John D.
University of Virginia

Boorstein, Hilary C.
University of Connecticut

Borrego, Joaquin
Texas Tech University

Bortfeld, Heather
Texas A&M University

Bowers, J. Michael
Oklahoma State University

Branch, Marc N.
University of Florida

Brandell, Jerrold R.
Wayne State University

Bregman, Joanne
Northwestern University

Bretherton, Inge
University of Wisconsin–Madison

Bright, Jim E. H.
University of New South Wales

Bronson, Judith Conoyer
University of Missouri–Columbia

Brookhart, Sarah
American Psychological Society

Brown, Eleanor D.
University of Delaware

Brown, Joy L. M.
University of Northern Alabama

Brown, Megan
Duke University Medical Center

Brown, Robert T.
University of North Carolina at Wilmington

Brown, Stephanie
University of Michigan

Browne, Joy V.
Center for Family and Infant Interaction

Bubany, Shawn T.
University of Kansas

Buck, Richard M.
Mount St. Mary's College

Buckley, Jennifer
University of North Carolina at Charlotte

Bullwinkel, Deborah M.
American Academy of Pediatrics

Burgess, Melinda C. R.
Southwestern Oklahoma State University

Burgess, Stephen
Southwestern Oklahoma State University

Burrow-Sanchez, Jason J.
University of Utah

Burstein, Joyce
California State University, Northridge

Cacioppo, John T.
University of Chicago

Cain, Kathleen M.
Gettysburg College

Caldera, Yvonne M.
Texas Tech University

Campos, Joseph J.
University of California, Berkeley

Camune, Barbara
University of Texas Medical Branch–School of Nursing

Canny, Susan
Stanford University

Cantu, Clara A.
University of Houston

Caporino, Nicole
University of South Florida

Cardozo, Patricia R.
San Diego State University

Carey, James R.
University of California, Davis

Carlton, Martha
Southern Illinois University Edwardsville

Caskie, Grace I. L.
Lehigh University

Cavanaugh, Cathy
University of North Florida

Chambers, Cynthia R.
University of Kansas

Chaney, John M.
Oklahoma State University

Chang, Nadine
New York University

Chang, Tae H.
California State University, Northridge

Chang-Rios, Karin Lee
University of Kansas

Cheek, Jonathan M.
Wellesley College

Chen, Denise
Rice University

Chen, Yiwei
Bowling Green State University

Childre, Amy
Georgia College & State University

Ching, Lai-Ming
University of Auckland

Chrisler, Joan C.
Connecticut College

Christ, Shawn E.
University of Washington

Churchill, James D.
Saint Louis University

Cicirelli, Victor G.
Purdue University

Cillessen, Antonius H. N.
University of Connecticut

Clark, Vincent P.
University of New Mexico

Clayton, Dawn B.
University of Kansas

Coatsworth, J. Douglas
Pennsylvania State University

Coelho, Jennifer S.
University of Toronto

Coffman, Daniel
Saybrook Institute

Cohen, Lawrence H.
University of Delaware

Cohen, LeoNora M.
Oregon State University

Coleman, Herbert L.
Austin Community College

Conrad, Clifton
University of Wisconsin–Madison

Conroy, David E.
Pennsylvania State University

Conway, Francine
Adelphi University

Cooke, D. Tighe
Worcester State College

Coolidge, Frederick L.
University of Colorado at Colorado Springs

Corbin, William R.
Yale University

Coussons-Read, Mary
University of Colorado at Denver

Cox, Daniel W.
University of Kansas

Coyle, Thomas R.
University of Texas at San Antonio

Crain, Timothy
University of Wisconsin–Milwaukee

Crowther, Janis H.
Kent State University

Curry Jr., Thomas E.
University of Kentucky

Cusack, Regina
Our Lady of the Lake University

Danso, Henry A.
Wesleyan University

Darcy, Marie U. A.
University of West Florida

Dasch, Kimberly
University of Delaware

Davey, Adam
University of Georgia

Day, Kristin M.
University of Central Florida

Dearing, Eric
University of Wyoming

Delaney, Peter F.
University of Florida

DellaVecchia, Francis
Marijuana Policy Project

Delwiche, Jeannine Frances
The Ohio State University

Dempsey, Jared P.
Texas Tech University

DeRuyck, Kimberly A.
University of Kansas

Detoma, Hannah R.
Medical University of South Carolina

Dick, Amy C.
Indiana University

Ditto, Peter H.
University of California, Irvine

Donalek, Julie
DePaul University

Donohue, Brad
University of Nevada, Las Vegas

Dooley, Hester
University of South Alabama

Dormire, Sharon L.
University of Texas at Austin

Dreyer, Meredith L.
University of Kansas

Dubkin-Lee, Shelley
Oregon State University

Ducenne, Lesley
George Mason University

Dukes, Richard L.
University of Colorado at Colorado Springs

Duran, Anne
California State University, Bakersfield

Edwards, Karen M.
Ithaca College

Edwards, Lisa M.
University of Notre Dame

Elbeshbeshy, Hany A.
University of Medicine and Dentistry of New Jersey

Elliott, Elizabeth M.
Florida Gulf Coast University

Elliott, M. Ruth
University of Alberta

Ellis, Thomas E.
Marshall University

Else-Quest, Nichole M.
University of Wisconsin

Emery, Charles F.
Ohio State University

Ercal, Nuran
University of Missouri–Rolla

Escoto, Carlos
Eastern Connecticut State University

Espinoza, Luis
George Mason University

Estes, David
University of Wyoming

Etaugh, Claire
Bradley University

Falwell, Katherine D.
Central Virginia Training Center

Farach, Frank J.
Yale University

Farrar, M. Jeffrey
University of Florida

Farrehi, Angela
University of Delaware

Farzin, Faraz
University of California, Davis M.I.N.D. Institute

Feder, Mike
George Mason University

Feeney, Dennis M.
University of New Mexico

Fein, Deborah A.
University of Connecticut

Fernandez, Elaine C.
Oklahoma State University

Ferraro, F. Richard
University of North Dakota

Ferrucci, Luigi
National Institute on Aging

Fincher, Cameron
University of Georgia

Finley, Gordon E.
Florida International University

Fireman, Gary D.
Texas Tech University

Fireman, Sheila M.
Texas Tech University

Fitch, R. Holly
University of Connecticut

Fitzgerald, Deirdre L.
Eastern Connecticut State University

Folley, Bradley
Vanderbilt University

Fondow, Meghan D. M.
Ohio State University

Forbes, Sean A.
Auburn University

Fountain, Nathan B.
University of Virginia

Fox, Jill Englebright
Virginia Commonwealth University

Fox, Meredith A.
American University

Franiuk, Renae
University of Wisconsin–Stevens Point

Frey, Teryl
Georgia State University

Frick, Karyn M.
Yale University

Frick, Paul J.
University of New Orleans

Fukumizu, Michio
University of Maine in USA and National Center of Neurology and Psychiatry in Japan

Fuller, D. Kim
University of Miami

Furman, Wyndol
University of Denver

Gane, Louise
University of California, Davis M.I.N.D. Institute

Gantt, Edwin E.
Brigham Young University

Gass, Mary P.
University of Michigan Health Systems

Geetter, Joshua
Telluride Medical Center

Gentile, Douglas A.
Iowa State University

Gfroerer, Kelly
Georgia State University

Gilstrap, Livia L.
University of Colorado at Colorado Springs

Gislason, Kristina
University of Wisconsin

Gleason, Tracy R.
Wellesley College

Glenn, Susan J. Moore
Glenn & Associates

Gluck, John P.
University of New Mexico

Goldfield, Eugene C.
Children's Hospital

Gordon, Lynn Melby
California State University, Northridge

Gore-Laird, Helen M.
University of Houston

Graham, Sandra
University of California, Los Angeles

Gray, Jeremy R.
Yale University

Green, Courtney E.
Florida Atlantic University

Green, James A.
University of Connecticut

Greene, Edie
University of Colorado at Colorado Springs

Grice, James W.
Oklahoma State University

Guerrero, Brenda Moretta
Our Lady of the Lake University

Guill, A. Bebe
Duke University

Güss, C. Dominik
University of North Florida

Haberlandt, Karl
Trinity College

Hagen, John W.
University of Michigan

Hagerman, Randi
University of California, Davis M.I.N.D. Institute

Haney, Michelle R.
Berry College

Hanley, Gregory P.
University of Kansas

Hannon, Brenda A. M.
University of Texas at San Antonio

Harper, James M.
Brigham Young University

Harrington, Ellen F.
Kent State University

Harris, Lauren Julius
Michigan State University

Harris, Yvette R.
Miami University of Ohio

Hartley, Sigan L.
University of Wyoming

Hartman, Sue
George Mason University

Hawkins, Barbara A.
Indiana University

Hayes, Marie J.
University of Maine

Hayslip, Jr., Bert
University of North Texas

Hays-Thomas, Rosemary
University of West Florida

Heft, Harry
Denison University

Heggenhougen, H. Kristian
Boston University

Henderson, Heather A.
University of Miami

Henderson, Laura
University of North Florida

Henkel, Linda A.
Fairfield University

Herman, Glenn
The University of Medicine and Dentistry of New Jersey

Hernandez, Dolores V.
University of Texas - El Paso

Herrera, Eve A.
University of Kansas

Herrmann, Douglas
Indiana State University

Hertenstein, Matthew J.
DePauw University

High, Elessa Clay
West Virginia University

Hill, Heather H.
University of Nevada, Las Vegas

Hillhouse, Maureen
UCLA Drug Abuse Research Center

Himelein, Melissa
University of North Carolina at Asheville

Himle, Michael B.
University of Wisconsin–Milwaukee

Hines, Denise A.
University of New Hampshire

Hinton, W. Jeff
University of Southern Mississippi

Hirsh, David
Goldsmiths College, London University

Hohmann, Lisa
University of Denver

Holahan, Carole K.
University of Texas at Austin

Holden, Greg

Holland, Jason
The University of Memphis

Holmes, Clarissa S.
Virginia Commonwealth University

Holmes, Rachel
DePauw University

Holmes-Lonergan, Heather A.
Metropolitan State College of Denver

Horne, Sharon G.
University of Memphis

Huberty, Thomas J.
Indiana University

Huffine, Carol L.
University of California, Berkeley

Hufnagel, Pamela P.
Penn State University

Hunter, Heather L.
University of Kansas

Hurst, Dawn R.

Husenits, Kimberly J.
Indiana University of Pennsylvania

Hyde, Janet Shibley
University of Wisconsin

Iacono, William G.
University of Minnesota

Ingvarsson, Einar T.
University of Kansas

Ito Ford, Alicia
University of Kansas

Iwaniec, Dorota
Queen's University Belfast

Izard, Carroll E.
University of Delaware

Jacobson, Beth P.
Gesell Institute of Human Development

Jacquin, Kristine M.
Mississippi State University

James, Lori E.
University of Colorado at Colorado Springs

Janke, Megan
University of Georgia

Janssen, Patricia A.
University of British Columbia

Jarquin-Valdivia, Adrian A.
Vanderbilt University

Jarvis, Helen
University of Newcastle

Jason, Leonard
DePaul University

Jayashankar, Lakshmi
Georgia State University

Jimerson, Shane R.
University of California, Santa Barbara

Johnson, David J.
Gannon University

Johnson-Pynn, Julie S.
Berry College

Johnston, William A.
University of Utah

Johnston-Robledo, Ingrid
State University of New York Fredonia

Jones, Samuel C.
Long Island University

Jones, Warren H.
University of Tennessee

Josephs, Lawrence
Adelphi University

Kalman, Melanie
Upstate Medical University

Kamo, Yoshinori
Louisiana State University

Kane, Michael J.
University of North Carolina at Greensboro

Kappen, Claudia
University of Nebraska Medical Center

Karver, Marc S.
University of South Florida

Kaspersson, E. Maria
University of Greenwich, UK

Kaye, Lenard W.
University of Maine

Kennedy, Alexandra
California Association of Marriage and Family Therapies

Kennison, Shelia M.
Oklahoma State University

Kerestes, Alyssa
DePauw University

Kerr, David C. R.
University of Michigan

Kessel, Frank S.
University of New Mexico

Kim, Su Yeong
University of Hawaii at Manoa

King, Joyce
Emory University

King, Kathryn J.
University of North Florida

King, Serena
University of Minnesota

Kirasic, Kathleen C.
University of South Carolina

Kisthardt, Mary Kay
University of Missouri–Kansas City

Kleinsorge, Christy
University of Kansas

Klinger, Rebecca S.
San Diego State University

Kocis, Christina
Stony Brook University

Kogan, Nathan
New School University

Kretchmar-Hendricks, Molly
Gonzaga University

Krueger, Robert F.
University of Minnesota, Twin Cities

Kruger, Daniel J.
University of Michigan

Kuther, Tara L.
Western Connecticut State University

Lachman, Margie E.
Brandeis University

Lack, Leon C.
Flinders University

Lane, Kathleen Lynne
Vanderbilt University

Lange, Lori J.
University of North Florida

Langhinrichs, Ruth
University of South Alabama

Langhinrichsen-Rohling, Jennifer
University of South Alabama

Langhout, Regina Day
Wesleyan University

Lassen, Stephen R.
University of Kansas

Laub, Cindy
University of Colorado at Colorado Springs

Laursen, Brett
Florida Atlantic University

LaVoie, Donna J.
Saint Louis University

Lazicki-Puddy, Tammy
Philhaven Behavioral Healthcare Services

Lee, Philip R.
Stanford University

Leevy, Carroll B.
University of Medicine and Dentistry of New Jersey

Leigh, Irene W.
Gallaudet University

Lemery, Kathryn S.
Arizona State University

Lerner, Richard M.
Tufts University

Levenson, Robert W.
University of California

Levitt, Heidi M.
The University of Memphis

Li, Su-Chen
Tulane University

Li, Yu-Teh
Tulane University

Liggett, Lawrence A.
University of Oklahoma School of Law

Lillard, Angeline
University of Virginia

Little, M. Annette
Vanderbilt University

Lonigan, Gregory
George Fox University

Louis, Linda L.
Brooklyn College

Love, Keisha M.
University of Missouri–Kansas City

Luecken, Linda J.
Arizona State University

Lyons, Edward A.
University of Manitoba

Ma, Lang
Tufts University

MacLean Jr., William E.
University of Wyoming

Maddox, George L.
Duke University

Madigan, Amy L.
George Mason University

Madrigal, Ramón Anthony
Florida College

Mahoney, Joseph L.
Yale University

Maikranz, Julie
University of Kansas

Malik, Neena M.
University of Miami

Malley-Morrison, Kathleen
Boston University

Manni, Melissa
University of Delaware

Manuel, Janeen C.
Wake Forest University

Mara, Cynthia Massie
Penn State Harrisburg

March, Robert
New York University

Margolis, Lewis
University of North Carolina at Chapel Hill

Markstrom, Carol A.
West Virginia University

Marsden, Anna Letitia
San Diego State University

Marsee, Monica A.
University of New Orleans

Marshuetz, Christy
Yale University

Martin, Leonard L.
University of Georgia

Martin, Rod A.
University of Western Ontario

Martinez, Rebecca S.
Indiana University

Martins, Renata K.
West Virginia University

Mason, Asiah
Gallaudet University

Masse, Leonard N.
National Institute of Early Education Research, Rutgers University

Masseoud, Feda
Georgia State University

Masters, Julie L.
University of Nebraska at Omaha

Mathews, Laura L.
Indiana University–Purdue University Indianapolis

Mayes, Sunnye
University of Kansas

Mayeux, Lara
University of Oklahoma

Maynard, Ashley E.
University of Hawaii

Mazur, Allan
Syracuse University

McAnulty, Richard D.
University of North Carolina at Charlotte

McCammon, Susan
East Carolina University

McClaren, Erin
George Mason University

McClure, Melissa
University of Connecticut

McCormick, Thomas R.
University of Washington Seattle

McCulloch, Brandi
University of Wyoming

McCullough, Margaret A.
DePauw University

McDermott, Hugh
The University of Melbourne

McDonnel, Anna C.
University of Kentucky

McElwain, Nancy L.
University of Illinois at Urbana-Champaign

McIntosh, Iain
Johns Hopkins University

McIver, Charlene D.
Psychology Associates P. C. and University of New Mexico

McKay, Dean
Fordham University

McKenzie, Ian K.
University of Exeter

McKiernan, Kevin
Fordham University

McMillan, Kathleen
Summershill Elementary School

McNeil, Daniel W.
West Virginia University

Medoff-Cooper, Barbara
University of Pennsylvania

Meerdink, Jo Ellen
Nebraska Wesleyan University

Mennin, Douglas S.
Yale University

Mercer, Jean
Richard Stockton College

Merseth, Katherine K.
Harvard University

Messinger, Daniel
University of Miami

Michalski, Richard L.
Florida Atlantic University

Middlemiss, Wendy
Penn State Shenango

Miller, Bryan D.
Gallaudet University

Miller, Margery
Gallaudet University

Miller, Scott A.
University of Florida

Milling, Leonard S.
University of Hartford

Mitchell, Montserrat C.
University of Kansas

Mize, Jennifer A.
University of Kansas

Molnar, Andrew E.
DePauw University

Moon, Simon
University of Wisconsin Oshkosh

Moore, Colleen F.
University of Wisconsin

Moore, Kathryn L.
University of Kentucky

Moore, Thomas R.
University of California, San Diego

Moores, Donald
Gallaudet University

Morelli, Claudia A.
Malcolm Randall Veterans Affairs Medical Center, Brain Research Center University of Florida

Morris, Edward K.
University of Kansas

Moses, Louis J.
University of Oregon

Moshman, David
University of Nebraska

Mottarella, Karen E.
University of Central Florida

Mueller Engheta, Canda D.
Kansas Department of Education

Mull, Danielle
University of Central Florida

Mullins, Larry L.
Oklahoma State University

Multon, Karen D.
University of Kansas

Murdock, Tamera B.
Counseling and Educational Psychology

Myers, Elizabeth M.
Kansas Department of Social and Rehabilitation Services

Nachtigall, Robert D.
University of California, San Francisco

Nadeua, Dennie

Negy, Charles
University of Central Florida

Neimeyer, Robert A.
The University of Memphis

Nelson III, W. Michael
Xavier University

Nissenbaum, Michal S.
Developmental Disabilities Center

Noel, Andrea M.
State University of New York New Paltz

Noland, Julia S.
Vanderbilt University

Noronha, Lavina M.
Our Lady of the Lake University

Norris, Virginia
South Dakota State University

Nugent, J. Kevin
Children's Hospital, Boston

O'Donnell, Susan L.
George Fox University

Ohr, Phyllis S.
Hofstra University

O'Laughlin, Elizabeth
Indiana State University

Oldham, Audrey L.
Eastern Oregon University

Olenchak, F. Richard
University of Houston

Olivo, Lana S.
University of Kansas

Olivola, Christopher Y.
Princeton University

Osborne, Danny
California State University, Bakersfield

Owen, Claire J.
Marymount Manhattan College

Palenchar, Deena R.
Western Psychiatric Institute and Clinic

Palmer, Edward L.
Davidson College

Papini, Mauricio R.
Texas Christian University

Parault, Susan J.
University of Maryland

Parish, Roy

Park, Crystal L.
University of Connecticut

Park, Sohee
Vanderbilt University

Patalano, Andrea L.
Wesleyan University

Patrick, Julie Hicks
West Virginia University

Pearman, Ann
Brandeis University

Pedrotti, Jennifer Teramoto
California Polytechnic State University

Pellegrini, Santiago
University of Buenos Aires, Argentina

Pepper, Carolyn M.
University of Wyoming

Perry, David G.
Florida Atlantic University

Perry, Louise C.
Florida Atlantic University

Phelps, Brady J.
South Dakota State University

Phillips, Deborah A.
Georgetown University

Phillips, Linda R.
University of Arizona

Plumbo, Margaret
University of Minnesota

Pole, Michele
Kent State University

Politikos, Natalie N.
University of Hartford

Polivy, Janet
University of Toronto at Mississauga

Poole, Therese
Georgia State University

Porter, Chebon A.
Birmingham Veterans Affairs Medical Center

Powell III, John L.
University of Kansas

Powell, Jack L.
University of Hartford

Pratt, Helen D.
Michigan State University

Pronin, Emily
Princeton University

Pryor, Robert G.L.
University of New South Wales

Puddy, Richard W.
Penn State University

Ramby, Sarah
East Carolina University

Rasmussen, Kristin L.
University of Kansas

Rasnake, L. Kaye
Denison University

Rebello, Pia R.
Columbia University

Rebellón, Cesar J.
University of New Hampshire

Reeve, Charlie L.
University of North Carolina at Charlotte

Reisenauer, Casi D.
Eastern Oregon University

Reissland, Nadja
University of Aberdeen

Richards, Margaret M.
University of Kansas

Richardson, Emily D.
University of Colorado

Riley, Michael A.
University of Cincinnati

Ritter, Kelli B.
Georgia State University

Robbins, Edwin S.
NYU Medical Center

Robbins, Lillian
Rutgers University

Roberts, Danae E.
University of Kansas

Roberts, Michael C.
University of Kansas

Robinson, Katherine M.
University of Regina

Robinson, Paul W.
Brigham Young University

Rogers, Kenneth A.
Georgia State University

Rosnov, Danielle
University of Kansas

Rosselli, Monica
Florida Atlantic University

Roth, Marianne Barbu
San Francisco State University

Roth, Wolff-Michael
University of Victoria

Rothblum, Esther D.
University of Vermont

Rotunda, Robert J.
University of West Florida

Roy, Kimberlee M.
University of Kansas

Ruban, Lilia M.
University of Houston

Runco, Mark A.
California State University, Fullerton, and the Norwegian School of Economics and Business Administration

Salinas, Moises F.
Central Connecticut State University

Salkind, Neil J.
University of Kansas

Saltzman, Ann L.
Drew University

Sanders, Cheryl E.
Metropolitan State College of Denver

Santhi, Nayantara
Metropolitan State College of Denver

Santos, Laurie R.
Yale University

Sargis, Robert M.
Rush University

Savla, Jyoti
University of Georgia

Scheibe, Karl E.
Wesleyan University

Scheidt, Douglas M.
State University of New York Brockport

Scherba deValenzuela, Julia
University of New Mexico

Schlewitt-Haynes, Lora
University of Northern Colorado

Schneider, Mary L.
University of Wisconsin–Madison

Schrick, Brittney H.
Southwestern Oklahoma State University

Schwartz, Caley B.
University of Miami

Scinicariello, Franco
Emory University

Sclafani, Joseph D.
University of Tampa

Seery, John
Pomona College

Segal, Daniel
University of Colorado at Colorado Springs

Seger, Carol A.
Colorado State University

Seifert, Kelvin L.
University of Manitoba

Sepulveda, Sandra
University of Delaware

Serper, Mark
Hofstra University

Sethi, Anita
New York University

Sever, Andrea M.
The University of Akron

Severy, Lawrence J.
Family Health International

Shackelford, Todd K.
Florida Atlantic University

Shapiro, Adam
University of North Florida

Shaw, Gordon L.
University of California Irvine

Sheiner, Eyal
Soroka University Medical Center

Shelley-Tremblay, John
University of South Alabama

Shoptaugh, Carol F.
Southwest Missouri State University

Shore, Cecilia M.
Miami University

Shultz, Kenneth S.
California State University, San Bernardino

Sikorski, Angela M.
University of Wisconsin–Milwaukee

Simon, Joan B.
University of Central Arkansas

Sims, Patricia
University of Southern Mississippi

Singer-Freeman, Karen E.
Purchase College State University of New York

Slavin, Kristi
University of Central Florida

Slavin, Robert E.
Johns Hopkins University

Sleigh, Merry J.
Winthrop University

Smith, Lisa M.
Tufts University

Smith, M. Cecil
Northern Illinois University

Smith, Michelle
Gallaudet University

Smith, Tabitha
Southwestern Oklahoma State University

Smolucha, Francine C.
Moraine Valley Community College

Solomon, Linda Z.
Marymount Manhattan College

Speer, Marcy
Duke University

Spence, Melanie J.
The University of Texas at Dallas

Spencer, Linda
Emory University

Spencer, S. Melinda
West Virginia University

Stanley, Jennifer H.
University of Florida

Stathis, G. Michael
Southern Utah University

Steele, Michael M.
University of Kansas

Steele, Ric G.
University of Kansas

Stehouwer, Donald J.
University of Florida

Steil, Janice M.
Adelphi University

Stephan, Jane F.
Virginia Commonwealth University

Stewart, Elizabeth A.
London School of Economics

Stewart, Peter K.
University of Kansas

Stone, Sherril M.
Northeastern State University

Strassberg, Donald S.
University of Utah

Stricker, George
Adelphi University

Stumpf, Janice L.
University of Michigan Health System and College of Pharmacy

Susskind, Joshua
University of Northern Iowa

Sussman, Amy L.
Georgetown University

Swain, Rodney A.
University of Wisconsin–Milwaukee

Swickert, Rhonda
College of Charleston

Swisher, Raymond R.
Cornell University

Tackett, Jennifer L.
University of Minnesota, Twin Cities

Tatsch, Rick
University of West Florida

Tauber, Robert T.
The Pennsylvania State University

Tauer, John M.
University of St. Thomas

Taylor, Marjorie
University of Oregon

Tenenbaum, Harriet R.
Brooklyn College

Tenney, Pamela R.
Marshall University

Thomas-Presswood, Tania
Gallaudet University

Thompson, Ada Lee
Vanderbilt University

Tiger, Jeffrey H.

Torres-Harding, Susan
DePaul University

Trentacosta, Christopher J.
University of Delaware

Trottier, Kathryn
University of Toronto

Troyer, Jason M.
Kansas State University

Tsao, Steven D.
Fordham University

Tuason, Ma Teresa G.
University of North Florida

Tumolo, Jacqlyn M.
University of Hartford

Turell, Susan C.
University of Wisconsin–Eau Claire

Ulrich, Suzan
Frontier School of Midwifery and Family Nursing

Urbina, Susana
University of North Florida

Vallacher, Robin R.
Florida Atlantic University

van Dijken, Suzan

Vandello, Joseph A.
University of South Florida

Vandenberg, Brian
University of Missouri–St. Louis

VanWallendael, Lori R.
University of North Carolina at Charlotte

Vartanian, Lesa Rae
Indiana University–Purdue University Fort Wayne

Velissaris, Nicholas G.
Society for Research in Child Development

Villanueva, Isidro
Arizona State University

Vissing, Yvonne
Salem State College

Vokes, Tamara
University of Chicago

Volling, Brenda L.
University of Michigan

Von Károlyi, Catya
University of Wisconsin–Eau Claire

Wade, Christine
University of Wyoming

Wade, John C.
University of Kansas

Wadsworth, Martha E.
University of Denver

Walker, Amber Derick
Institute of Professional Practice

Walker-Barnes, Chanequa
University of North Carolina at Chapel Hill

Wang, Mo
Bowling Green State University

Ward, Jeff
Australian National University

Ward, Taeh A.
University of Tulsa

Warren, Elyse A.
Connecticut College

Watson, Mary Ann
Metropolitan State College of Denver

Watt, Norman F.
University of Denver

Way, Erin
George Mason University

Webster, Alec
University of Bristol

Weekes-Shackelford, Viviana A.
Florida Atlantic University

Wenzel, Amy
University of Pennsylvania

Werth Jr., James L.
University of Akron

White, Glen
University of Kansas

White, Jill M.
University of Kansas

White, Michael Grant
Optimal Breathing

White, Molly
Oklahoma State University

White, Scott

White-Traut, Rosemary C.
University of Illinois at Chicago

Whitten, Shannon
University of Central Florida

Widoe, Rebecca K.
West Virginia University

Wildsoet, Christine
University of California

Williams, Deanne R.
American College of Nurse-Midwives

Wilson, Leandra B.
University of Kansas

Winningham, Robert G.
Western Oregon University

Winsler, Adam
George Mason University

Woehr, Sarah M.
University of California, Santa Barbara

Woodrow-Lafield, Karen A.
University of Notre Dame

Woolard, Jennifer
Georgetown University

Wright, Jennifer Cole
University of Wyoming

Wright, Nicole
University of Central Florida

Wrobel, Gretchen Miller
Bethel University

Ybarra, Gabriel J.
University of North Florida

Zagumny, Matthew J.
Tennessee Technological University

Zautra, Alex J.
Arizona State University

Zemore, Sarah E.
Alcohol Research Group

Zevenbergen, Andrea A.
State University of New York Fredonia

Zhou, Ling-Yi
University of St. Francis

Zierten, Elizabeth A.
University of Colorado at Colorado Springs

Preface

The field of human development focuses on the growth and development of the human being, including physical, social, psychological, and emotional development from conception through death. Under the broad umbrella of the term human development are found countless topics, many of which are explored in this encyclopedia. In addition, as our knowledge about development has increased through the use of more sophisticated research techniques and large funding programs, we have seen a growth in the general interest in these areas, hence the proliferation of trade and mass-market books about development that are readily available and accessible to the public.

Although there are hundreds of books about different topics in development, and there are thousands of researchers pursuing more information about the major topics on which specialists in human development focus, there are few comprehensive overviews of these topics and their importance. There are even fewer books that convey this information in a way that is comprehensive, authoritative and informative, and yet not too technical. The purpose of this multivolume *Encyclopedia of Human Development* is to convey this information in that way.

Through approximately 650 entries, experts in each of the areas contained in these pages contribute an overview and an explanation of the major topics in the field of human development.

The underlying rationale for the selection of particular topics and their presentation in this encyclopedia comes from the need to share with the naïve (about human development, that is) but educated reader topics that are rich, diverse, and deserving of closer inspection. Within these pages we provide the overview and the detail that we feel is necessary to become well acquainted with topics that do a good job of representing the field of human development.

As is the case with many encyclopedias, the *Encyclopedia of Human Development* is also organized in alphabetical order, from A through Z. However, particular themes were identified early on that could be used to conceptually organize the information and the entries. These themes or major topic areas constitute the Reader's Guide, which begins on page xv. Categories such as adolescence, education, emotional development, older adulthood, religion, and substance abuse are only a few of the many that help organize the entire set of contributions.

THE PROCESS

The task of developing a complete and thorough review of the topic of human development started with the identification of entries that the editor and advisory board (see page vii) thought were important to include. We tried to make sure that these entries included topics that would be of interest to a general readership but did not require the use of terms that were too highly technical or too far removed from the interests of the everyday reader. This list was reviewed several times, until we felt that it was a comprehensive set of topics that best fit the vision for the encyclopedia.

As expected, this list was edited and revised as we worked and as authors were recruited to write particular entries. Enthusiastic authors suggested new topics that might have been overlooked and noted topics that might not appeal. All of these changes were taken into consideration as the final list was assembled.

The next step was to assign lengths to particular entries, which ranged from 400 words for bibliographies (such as the one on Charles Darwin) to 5,000 words for articles (such as the one on the human genome). In between, there were articles that were 1,500 and 3,000 words in length. At times, authors asked that the length

be extended because they had so much information they wanted to include, and they felt that the limitation on space was unwarranted. In most cases it was not a problem to allow such an extension.

As for choosing authors, this step took place through a variety of mechanisms, including identifying individuals based on recommendations from the advisory board and the editor's professional and personal experiences, contacting authors of journal articles and books who focused on a particular area directly related to the entry, and asking for referrals from other individuals who are well known in the field.

Once authors were identified and invited, and once they confirmed that they could participate, they were sent detailed instructions and given a deadline for the submission of their entry. The result, after editing, layout, and other production steps, is in your hands.

HOW TO USE THIS BOOK

Like a good meal, a book is meant to be fully enjoyed, and, while most people believe that encyclopedias are only used for reference purposes, this three-volume encyclopedia is an easy one to sit down with open up, and browse through.

As was mentioned earlier, a primary goal of creating this set of volumes was to open up the broad discipline of human development to a wide and general audience. For this reason, you will find topics that are of particular interest to the general public, such as AIDS, friendship, retirement, and creativity.

Take these books and find a comfortable chair; browse through the topics and read the ones that catch your eye. We are confident that you will continue reading and looking for additional related entries (see the end of many articles for related entries in the set) and, in doing so, learn more about whatever interests you.

Should you want to find a topic within a particular area, consult the Reader's Guide, which organizes entries within this three-volume set into general categories. Using this tool, you can quickly move to an area or a specific topic that you find valuable and of interest.

ACKNOWLEDGMENTS

Any project as ambitious as this that contains more than 600 entries by more than 650 talented experts has to be the work of many people, and I would like to acknowledge them all. If this encyclopedia sees success, it is to a very large extent due to the work of these and other fine people.

First, thanks to the advisory board, a group of scholars in many different areas who took the time to review the list of entries and make invaluable suggestions as to what readers might find valuable and how that topic should be approached. These are very busy people who took the time to help the editor develop a list that is broad in scope and represents the most important topics in human development. You can see a complete list of these fine people on page vii.

My editor at Sage Publications, Jim Brace- Thompson, deserves a great deal of thanks for bringing this project to my attention and giving me the chance to make it work. He has been steadfast in his support and advice throughout. I call and he is there to answer my question; I e-mail him and I have an answer in minutes. What else could an editor ask for?

Other Sage people also helped make this task both enjoyable and helped create the useful, informative, and approachable set of volumes you hold in your hands. Among these people are Karen Ehrmann, editorial assistant; Tracy Alpern, project editor; Rolf Janke, Sage References publisher; and Sara Tauber, developmental editor.

My sincere thanks and appreciation go to the managing editors, Kim DeRuyck and Kristin Rasmussen, both advanced graduate students, who managed the submissions from the recruitment of authors to the transmission of the final documents to Sage. Both completed their tasks with enthusiasm, initiative, and perseverance, answering endless questions through thousands of e-mails to hundreds of authors. Thank you sincerely.

And finally, of course, how could anything of this magnitude ever have been done without the timely execution and accurate scholarship of the contributing authors? They understood that the task at hand was to introduce educated readers (such as yourself) to new areas of interest in the broad field of human development, and without exception I think they did a wonderful job. You will see throughout that their writing is clear and informative—just what material like this should be for the intelligent reader. To them, a sincere thank you and a job well done.

—Neil J. Salkind
University of Kansas
July 2005

A

Aging

First we are children to our parents, then parents to our children, then parents to our parents, then children to our children.

—Milton Greenblatt

ABECEDARIAN RESEARCH PROJECT

The Abecedarian Research Project was an intensive research program designed to study the effect of high-quality educational child care on children from low-income families.

Researchers selected infants from low-income families who were found to be at particularly high risk for educational failure because of low maternal educational levels. The participants received full-time, high-quality educational intervention in a child care setting from their infancy until the age of 5. Each participant was individually prescribed specialized learning games and activities throughout each day that focused on social, emotional, and cognitive areas of development with particular emphasis on language.

Participants' progress was monitored over time with follow-up studies conducted at various ages and with a final study of the original participants at age 21. Findings demonstrated that important, long-lasting benefits were associated with the early childhood program.

The project was initiated in 1972 at the Frank Porter Graham Child Development Center at the University of North Carolina (UNC) in Chapel Hill and was finalized according to plan in the mid-1980s in order to examine the continued effects on participants. The initial project was funded by grants from the Mental Retardation and Developmental Disabilities Branch of the National Institutes of Child Health and Human Development and from the State of North Carolina. The principal investigator of the original study was Craig Ramey, PhD.

BACKGROUND

Studies have shown that poverty in early childhood has long-lasting negative consequences for cognitive development and academic outcomes. Children in low-income families tend to lag behind their peers in the earliest school years, suggesting that they enter school at a disadvantage. University-based model programs and research by government organizations have attempted to understand and overcome these negative academic odds.

Most of these endeavors focused on the theory that by providing early intellectual stimulation to at-risk children, cognitive development would be enhanced and allow children to enter school better prepared to learn. This preparation would, in theory, increase the probability of early school success and eventually result in vocational achievement and positive social adaptation in adulthood.

Unfortunately, few early childhood programs were sufficiently well controlled to permit scientists to evaluate the extent to which long-term outcomes were

attributable to the program itself. Researchers were able to assess short-term gains in cognitive development, and they did find improvement in academic performance; however, these gains began to dissipate 3 to 6 years after participants entered school.

The Abecedarian project differed from most other early childhood programs in that (1) it was a carefully controlled study in which half the participants were randomly assigned to receive early intervention in a high-quality child care setting and half were in a nontreated control group; (2) it began in early infancy, whereas other programs began at age 2 or older; and (3) treated children had 5 years of exposure to high-quality early education, whereas most other programs were of shorter duration. This degree of scientific control gave investigators greater confidence that differences between the treated and untreated individuals could be attributed to the intervention itself, rather than to differences among treated and untreated families.

STUDY DESIGN

Along with principal investigator Dr. Craig Ramey, Margaret Burchinal, PhD, adjunct professor, biostatistics, UNC acted as senior scientist and director of design and statistics. Other investigators included Martie Skinner, PhD, adjunct assistant sociology professor at UNC–Greensboro; Elizabeth P. Pungello, PhD; Barbara Wasik, PhD; and Oscar Barbarin, BA, MA, MS, PhD, Fellow, Preyer Distinguished Fellow for Strengthening Families, psychology, UNC. Joseph Sparling, PhD, and Isabelle Lewis were the codevelopers for the "Learning Games" curriculum.

One hundred eleven healthy infants whose average age was 4.4 months were selected for participation in the Abecedarian Research Project. Fifty-seven infants (the treatment group) were randomly assigned to participate 8 hours a day, 5 days a week, 50 weeks a year with programmed "learning games" designed to focus on cognitive and fine motor skills, language, and gross motor skills. They also received free diapers, food, and transportation and participated in academic, physical, and social enrichment activities. The remaining 54 infants (the control group) experienced either locally available child care or no specialized care.

When the children entered kindergarten, researchers further divided the control and treatment groups. A home and school resource teacher provided academic support to one half of each group, serving as a liaison between families and school officials for the first 3 years of school. Individualized curriculum packets helped parents of the selected families work with their children at home. This portion of the study was designed to determine the different effects of preschool and primary school interventions.

The social and intellectual development of all participants was measured at ages 3, 4, 5, 6½, and 8 years old with the Stanford-Binet and the Wechsler Preschool and Primary Scale of Intelligence tests. Math and reading achievement was measured at ages 8, 12, 15, and 21 using the Woodcock-Johnson Psycho-Educational Battery.

Investigators completed a young-adult follow-up assessment of study participants. At age 21, cognitive functioning, academic skills, educational attainment, employment, parenthood, and social adjustment were measured. One hundred four of the original 111 infants (53 from the intervention group and 51 controls) were assessed.

FINDINGS

Both the treated and untreated children were initially comparable with respect to scores on infant mental and motor tests. However, from the age of 18 months and through the completion of the child care program, children in the intervention group had significantly higher scores on mental tests than children in the control group. Follow-up cognitive assessments completed at ages 12 and 15 years showed that the intervention group continued to have higher average scores on mental tests. The treated children scored significantly higher on reading and math tests from the primary grades through middle adolescence.

The cognitive and academic benefits from this program are stronger than for most other early childhood programs. Enhanced language development appears to have been instrumental in raising cognitive test scores. As a bonus, mothers whose children participated in the program achieved higher educational and employment status than mothers whose children were not in the program.

FOLLOW-UP STUDIES

A 15-year follow-up study was carried out. Treated children scored higher on reading and math tests through early adolescence, had a lower rate of grade retention (i.e., flunking or repeating a grade), and were less likely to need special education.

A 21-year follow-up study was performed testing 104 of the original participants. This follow-up study was funded by the Maternal and Child Health Bureau of the Department of Health and Human Services, the Office of Educational Research and Improvement, the Department of Education, and the David and Lucile Packard Foundation. The principal investigator for this study was Frances Campbell, PhD. Relative to their peers in the control group, the participants continued to have a lower rate of grade retention, were less likely to need special education, had higher reading scores, had higher math scores, were more likely to be in school, completed more years of school, were more likely to have attended a 4-year college, were more likely to be engaged in skilled jobs, and were more likely to postpone parenthood.

Young adults who received early educational intervention had significantly higher mental test scores from toddlerhood through age 21 than did untreated controls. Averaged over the age span tested, the mental test score results were considered educationally meaningful. Additional research in 2001 by Reynolds, Temple, Robertson, and Mann indicated a 51% reduction in maltreatment of children who attended the program, suggesting an overall positive effect on treated families.

IMPLICATIONS

Because poverty in early childhood has long-lasting negative consequences for cognitive development and academic outcomes, low-income children do not always achieve their highest potential. Full-time, year-round preschool child care for low-income families appears to be a positive factor in academic achievement. Thus, quality early childhood education can make a critical difference in the later success of these children and can provide long-term benefits both to the individual and to society.

FURTHER RESEARCH

Dr. Frances Campbell of the Frank Porter Graham Child Development Center has followed the participants through their adulthood, and as of this writing, has planned an age-30 follow-up report. Leonard Masse and W. Steven Barnett performed a cost-benefit analysis on the project and found that the benefits of the program outweighed the costs by a factor of 4.

And, in order to further appreciation of the results of the study and to disseminate their findings to parents, educators, and policy makers, original Abecedarian Research Project principal investigator Craig Ramey, PhD, and Sharon Ramey, PhD, completed a 5-year study of 10,000 children from kindergarten through third grade with an aim determining what contributes to a young child's school success. A result of this study is their 1999 book, *Going to School: How to Help Your Child Succeed,* which discusses why the transition to school is such a significant issue and emphasizes the expectations of parents and educators associated with this transition.

CONCLUSION

The importance of high quality, educational child care from early infancy has been shown to improve the educational experience of disadvantaged children. The Abecedarian Research Project has provided scientific evidence that early childhood education significantly improves the scholastic success and educational attainments of disadvantaged children even into early adulthood.

—Susan J. Moore Glenn

See also Early Intervention Programs

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ABORTION

The technical definition of induced abortion is the removal of products of conception from the uterus of a pregnant woman. Throughout recorded history, there is evidence that women have found the means to limit and space their childbearing through the use of induced abortion. Women of all identities and living in a wide variety of conditions all over the world continue to choose termination as one response to unintended pregnancy. In 2000, an estimated 16 to 21 of every 1,000 women in the United States ages 15 to 44 had induced abortions. The abortion rate has been stable or declining since the 1980s. Another way to express the frequency of abortion is the number of induced abortions compared with the number of live births. In 2000, this ratio was estimated to be 246 per 1,000 births, consistent with a declining trend over the past two decades. These statistics do not include abortions that happen spontaneously, usually called miscarriages.

WHO HAS ABORTIONS?

Nearly half (48%) of all pregnancies that occur in the United States are not intended, and about the same proportion (47%) of unintended pregnancies is resolved by abortions. Most women (53%) who have abortions were using some form of birth control during the month they became pregnant, but misused or experienced failure of their contraceptive product or method. By the age of 45, about 43% of women in the United States have experienced at least one abortion. Among the women choosing to have abortions at a given time, most (61%) have already given birth to at least one child, and nearly half (48%) have had at least one previous abortion.

There is not one particular type of woman who is likely to have an abortion. About two thirds of the women having abortions have never been married. Most (56%) are in their 20s, and fewer than 20% are teenagers.

Women of all racial or ethnic, religious, and socioeconomic groups obtain abortions. The largest number (41%) of abortions are performed on non-Hispanic white women, but black women are three times as likely and Latinas or Hispanic women are twice as likely as white women to have an abortion in a given year. Women who identify themselves as Catholic are only slightly less likely to have abortions than other women in the United States. Poor and low-income women are more likely to have abortions than those who are more affluent.

Abortions occur for many reasons, and women tend to have multiple explanations for their decisions to terminate pregnancies. The most common reason, given by three fourths of women having abortions, is that having a baby at that time in their lives would conflict with major commitments such as work, school, or existing family responsibilities. Two thirds of women having abortions give economic reasons for delaying or foregoing parenthood. Half of women choosing abortion do not have the supportive relationship that they would like for becoming a parent—either they do not want to start out as a single mother, or they are having problems in their relationship with a husband or partner. About 13,000 women a year choose abortions to terminate pregnancies resulting from rape or incest.

WHEN ABORTION WAS ILLEGAL

Major complications from induced abortion are very rare in the United States, occurring in less than 1% of abortions. The risk for death from childbirth, an uncommon event in industrialized countries, is 10 times greater than the mortality risk of abortion. The safety of legal abortion is in stark contrast to the

danger women faced before abortion was decriminalized in the United States in 1973. In the 1950s, for example, there were about 1 million illegal abortions every year, with at least 1,000 associated deaths.

Before legalization, some courageous and qualified providers took considerable personal risks to offer safe procedures to women in need. Women with adequate financial and social resources were sometimes able to seek safe abortions in legal settings outside the United States. Desperation often drove other women to unskilled abortionists working in unsanitary conditions. Women who survived so-called back-alley abortions of this sort or attempts to self-abort sometimes suffered painful chronic illnesses, lost the ability to have children, or experienced trauma that affected their psychological health and well-being.

JUDICIAL AND LEGISLATIVE RULINGS

On January 22, 1973, the U.S. Supreme Court handed down the *Roe v. Wade* decision, which created a legal, though limited, right to abortion. *Roe v. Wade* concluded that the "right of privacy . . . founded in the Fourteenth Amendment's concept of personal liberty . . . is broad enough to encompass a woman's decision whether or not to terminate her pregnancy." Based on their individual right to privacy, women in consultation with their doctors gained the legal right to choose abortion in the first 3 months (or first trimester) of pregnancy. State laws were permitted to limit second-trimester abortions "only in the interest of the woman's safety." In the final 3 months (third trimester) of pregnancy, *Roe v. Wade* allowed states to protect the fetus by restricting abortion unless there is potential danger to the life or health of the pregnant woman.

Roe v. Wade granted women the right to early abortion with a physician's consent, but it did not guarantee financial or medical access to abortion. In 1976, the U.S. Congress passed the Hyde amendment to a federal appropriations bill, eliminating federal reimbursement for induced abortions from Medicaid public insurance coverage for low-income women. As of 2004, Congress had annually reinstated this ban on federal funding of abortion, with narrow exceptions for rape, incest, and threats to the life of the woman if she continued the pregnancy. In 2001–2002, the cost of early surgical abortions was highly variable. On average, women were charged $364 for procedures in specialized clinics and $632 in physicians' offices. The average amount paid by women without insurance coverage for abortion was $372.

Funding issues have been only one arena of debate in the controversy over women's right to abortion. Religious and personal beliefs lead some people to reject abortion as an option for themselves. Among those with personal objections to abortion, some advocate for the right of other people to make their own decisions. Others attempt to use the judicial or legislative system to return to the situation that existed before legalization. Attitudes toward sexuality and women's autonomy, as well as fundamental beliefs about social control over individual decision making, motivate activists on different sides of the abortion issue.

The U.S. Supreme Court heard another major abortion case in July 1992. In *Planned Parenthood v. Casey,* the court reviewed a Pennsylvania statute that required women seeking abortions to receive counseling from physicians in favor of continuing their pregnancies, and then to wait at least 24 hours before obtaining an abortion procedure. Notification of spouses and parents about requests for abortions was also required. Only the provision for spousal notification was considered to impose an undue burden on women by the Supreme Court, and this provision was thus judged unconstitutional. The Court acknowledged the situation of women in abusive relationships, with the potential for violence perceived as part of the burden for women wishing to act independently of their partners. Other provisions of the statute were left intact, although most were seen by the Court as medically unnecessary and burdensome to a lesser extent.

Although *Roe v. Wade* was not overturned by the Supreme Court in the *Planned Parenthood v. Casey* decision, the Court's strict interpretation of undue burden set a precedent for states to impose numerous restrictions on women exercising their right to abortion. Systematic attacks have eroded women's access to abortion despite its legal status. As of 2002, 32 states required parental consent or notification for adolescents seeking abortions. In many of these states, it is possible to seek a "judicial by-pass" of parental involvement, but this provision can only be used if a teen has the information and resources to bring a persuasive request to a court. Eighteen states in 2002 mandated delays in accessing abortion pursuant to state-directed counseling. Four states disallowed private insurance coverage of abortion services, and another state required companies to offer alternative policies excluding abortion coverage.

Under the second Bush administration, abortion opponents made significant inroads by labeling a

rarely used procedure "partial-birth" abortion. Most (88%) abortions are performed in the first 12 weeks of pregnancy, and very few occur after 20 weeks. By evoking distorted images of abortion, antiabortion activists succeeded in getting the so-called Partial-Birth Abortion Ban Act of 2003 passed by Congress and signed by President Bush in November 2003. Lawsuits ensued to challenge the constitutionality of the ban and prevent its enforcement, based on the lack of any exceptions to protect the health or life of the woman. As of June 2004, a federal district judge ruled favorably on a lawsuit brought by Planned Parenthood Federation of America (PPFA), and action on other suits was pending.

ACCESS TO ABORTION

Restrictions on abortion and lack of broad access to abortion services are unique for a legal medical procedure. It is difficult to imagine similar infringements on medical decision making in clinical areas such as heart surgery or cancer treatment. Because of political opposition and associated harassment and violence toward patients and providers, the United States now has a limited number of active abortion providers. In 2000, 87% of U.S. counties (home to more than one third of all women of reproductive age) had no abortion provider. The number of providers declined from 2,042 in 1996 to 1,819 in 2000, with rural areas most seriously underserved.

Most medical residents specializing in obstetrics and gynecology (OB/GYN) are not required to perform first-trimester induced abortions as part of their training. As of 1995, only 12% of OB/GYN residency programs routinely offered abortion training. In 1995, the Accreditation Council for Graduate Medical Education (ACGME) issued a requirement for OB/GYN residencies to provide training for management of spontaneous abortion. In contrast, programs are only required to provide "access to experience" with induced abortion, and residents can opt out of training for elective procedures. A 1998 survey indicated a positive response, with nearly half (46%) of respondents reporting provision of routine training subsequent to the new guidelines. Information on training is incomplete, however, because many programs did not respond to the survey.

The New York City (NYC) chapter of the National Abortion and Reproductive Rights Action League (NARAL/NY) started its own residency training initiative in response to the provider shortage. In 2002, NYC supported a requirement for all OB/GYN residents working in the city's public hospitals to receive training in surgical and medical abortion through this program. After implementing the program in New York, NARAL/NY began working to disseminate their training initiative in other states. California has also legislated abortion training for OB/GYN residents in state-sponsored medical schools. The California initiative also has an "opt-out" provision, which allows schools to offer training indirectly through agreements with other institutions. Training in procedures for early abortion is recommended by the Council on Residency Education in Family Practice, yet 71% to 88% of family practice residency programs did not offer such training in 1995.

U.S. Food and Drug Administration (FDA) approval of pharmaceutical agents to induce abortion medically rather than surgically, granted in 2000, could increase the number of U.S. abortion providers. Past experience in several European countries showed mifepristone to be a safe option for inducing abortions without surgery, but acceptance by European women and providers was conditioned by cost and other issues. The early experience with medical abortion in the United States has been promising. Many women prefer the privacy and autonomy of the medical alternative, and acceptance by providers appears to be growing. However, this recently introduced technology requires medical supervision and does not eliminate the need for legal, safe, and accessible surgical procedures. Women's preferences will continue to be influenced by many practical, physiological, and psychological factors.

—Trude Bennett and Dennie Nadeau

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ABSTRACT REASONING

Humans must rely on intrinsic cognitive functions for logical conclusions in a variety of situations. Abstract reasoning is a cognitive mechanism for reaching logical conclusions in the absence of physical data, concrete phenomena, or specific instances. Abstract reasoning is essentially a generalization about relationships and attributes as opposed to concrete objects. The capacity for abstract reasoning develops from the initial reasoning about physically present, concrete objects and the subsequent formation of categories and schemas, or cognitive structures that organize and generalize information about specific instances.

In the development of abstract reasoning capacity, cognitive manipulation of objects or data is used to formulate conclusions about relationships. For example, in learning mathematics, one must proceed from understanding the concept of multiple objects in the present visual field to understanding the concept of addition. These new conclusions are successive, just like mathematics themselves. This process is a cognitive transcending of lower-level knowledge to form a new construction, or what Jean Piaget dubbed *reflective abstraction.*

Piaget concluded that the accumulation of knowledge was based partly on this concept of new construction. His hypothesis of schemas application involves two joint mental activities, which he called *assimilation* and *accommodation.* The former involves an integration of new information into previously existing constructs. The latter involves modifying schemas around the new stimulus. Piaget collectively called these operations *equilibration,* in reference to the laborious attempt to maintain homeostasis in cognitive representation. In essence, Piaget suggested that the accumulation of knowledge is a marriage of experience and adaptation.

Piaget thought that children do not form an internal representation of abstract concepts (such as time) on the basis of experience alone. Rather, they form schemas through constant conduction of assimilation and accommodation. Although his original ideas have been elaborated on, Piaget's constructionist view has been embraced for defining universal aspects of cognitive development.

Piaget categorized cognitive development into four maturational stages, and it is in the final stage that abstract reasoning is said to develop. The first stage, the *sensorimotor stage* (birth to 2 years), involves development of goal-oriented interaction and object permanence. The second stage, or *preoperational stage* (2 to 6 years), is characterized by a child's response to visual stimuli. That is, internal representations of the environment are shallow and based only on immediate experience. The child is incapable of projecting relationships within the environment to a higher level. The third stage, or *concrete operational stage* (7 to 12 years), emerges with the development of cognitive reversibility, or the ability to comprehend dynamic states. In the final stage, or *formal operational stage,* (beginning around 12 years), Piaget proposed that relative abstraction skills have been assembled.

Piaget hypothesized that a child at the formal operational level is capable of forming new constructs and make logical deductions in the absence of first-hand experience; that is, the child is able to reason abstractly. The original theory has been evaluated and elaborated on, yet neo-Piagetian theorists maintain the notion that abstract reasoning requires new construction. It is not believed, however, that abstract reasoning peaks at the formal operational level. Research suggests that the development of abstract skills may continue into late adulthood and is contingent on the amount of experience with abstract reasoning.

—Kristi Slavin and Shannon Whitten

See also Cognitive Development, Theories of Development

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ACCOMMODATION

According to Piaget's theory of cognitive development, children's thinking occurs as they begin to adapt to their environment in increasingly satisfactory ways. *Schemes* are the techniques that children employ during adaptation. Schemes are patterns of actions that children transfer or generalize by repeating them under similar circumstances or to meet recurring needs. Schemes can be simple or complex patterns of action. An infant, for example, employs a simple eating scheme in turning toward, latching onto, and sucking a nipple that brushes his or her cheek.

An adult follows a much more complicated scheme for eating as he or she sits at a table, spreads a napkin in the lap, and uses a knife and fork to consume food. Schemes are reflexive for infants. As children grow and acquire additional sensorimotor abilities, their reflexive schemes are enlarged and enhanced. When they encounter a need or a new stimulus in the environment, children inventory their existing schemes to determine which might be used to meet the current need or explore the stimulus. If a match between the need or stimulus and a previously developed scheme is found, adaptation has occurred. If, however, children cannot identify a match, they attempt to achieve adaptation through either *assimilation* or *accommodation.*

During *assimilation,* children achieve adaptation by acting on the environment or objects in the environment to make them fit into existing schemes. Eventually, however, children will encounter a need or a stimulus that cannot be assimilated. They may respond in one of two ways. At the encounter, children may completely ignore or pass by the event without registering it, such as when an adult shows a child a more efficient way to use a tool but the child reverts back to the previous method without attempting what was modeled. A second response may occur when children are dissatisfied with their continued efforts to achieve a match between their existing schemes and an environmental stimulus. Children may use new information from the environment to adjust or modify existing schemes and meet their needs. Adjusting or modifying schemes to meet new needs is called *accommodation.*

For example, a young child may have an established scheme in which he or she calls any large item with wheels a *car.* The child points at a large wheeled item with a box on the back and says "car!" The child's father responds, "No, that's a truck!" The child repeats, "Truck!" and proceeds to identify another similar vehicle in the same way, indicating that he or she has modified or accommodated the scheme based on the new information.

In Piaget's theory, assimilation and accommodation are processes of change. Children change or transform the environment to fit their existing schemes during assimilation, and they change their schemes to accept new environmental information during accommodation. Children and adults use both processes interchangeably and concurrently. Although play is basically assimilation, or the dominance of assimilation over accommodation, accommodation becomes dominant when children imitate another's actions or roles or during periods of intense learning and development.

—Jill Englebright Fox

See also Assimilation

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ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

Acquired immune deficiency syndrome (AIDS) is an advanced stage of infection with the human immunodeficiency virus (HIV). AIDS was first identified in 1981 in the United States and was subsequently identified around the world. HIV disease begins by causing the failure of the immune system, the development of any of a set of opportunistic infections (OIs), AIDS, and eventually death. Treatment of HIV disease has improved with the development of new drugs, increasing success at delaying symptoms and reducing mortality rates. However, treatment is not always effective, has significant side effects, is expensive, and is not universally available, especially among the poor and in developing countries.

HIV is a virus that is found most predominantly in body fluids containing white blood cells (e.g., blood, semen, breast milk, and cervical/vaginal secretions). HIV is most often transmitted when one of these body fluids from an infected person enters the blood system of an uninfected person through an opening in the body. HIV transmission most often occurs through sexual intercourse, sharing infected injection equipment involved in illicit drug use, breast-feeding, or transfusion of untested blood products, which does not occur in the developed world. Prevention of HIV infection generally involves modification of behaviors related to these modes of transmission.

HOW DOES THE IMMUNE SYSTEM FUNCTION?

To understand HIV and AIDS, it is first necessary to understand some rudimentary principles of how the immune system functions. Intact skin is the first component of a functioning immune system. Skin provides a barrier against many infections, including HIV. If an infectious agent such as HIV gets past that first barrier, either through an existing opening, such as a mucosal membrane (e.g., vaginal, anal, urethral tissue) or through a puncture (e.g., injection drug use), the cell-mediated immune system responds to the infection. Generally, the immune system consists of a collection of different types of cells, each of which plays a different role in a sequence of steps that collectively create an immune response. All parts of the immune system are necessary to ensure an unimpaired immune response.

First, a foreign particle such as HIV is introduced into the body. The foreign body is an antigen. The antigen is identified as foreign by immune cells known as *macrophages.* These cells interact with T4 cells (also known as *T helper,* or T_H, *cells* and as *CD4⁺ cells*), activating the T4 cell. Once activated, the T4 cells secrete lymphokines (e.g., gamma interferon) and begin to divide and replicate. This activity subsequently causes B lymphocytes, or B cells, to multiply and produce antibodies. Antibodies bind to the specific antigen, marking it for destruction. Cytotoxic T lymphocytes (also known as *T8 cells*) eliminate virus-infected cells. After this infection is resolved, T and B memory cells remain to provide a quick immune response in the case of reinfection with the same antigen. In addition, remaining antibodies provide humoral immunity against future reinfection.

HOW DOES HIV INTERFERE WITH IMMUNE SYSTEM FUNCTIONING?

HIV binds specifically to cells that have the CD4 receptor on their exterior membrane. Therefore, the T4 cell, which is also designated as $CD4^+$ to indicate the presence of this receptor, is one of the cells that HIV can infect. Once HIV binds to the T4 cell, which also involves binding to the fusin and CC-CKR-5 receptors on the cell membrane, it passes through the cell membrane into the T4 cell. Inside the T4 cell, the virus sheds the protein coat, releasing the viral genetic material, which is RNA, into the cell. Next, the viral RNA is converted into viral DNA by an enzyme

reverse transcriptase. The viral DNA moves into the nucleus of the T4 cell, where it becomes part of the human DNA with the involvement of the enzyme integrase. Subsequently, the merged genetic material begins to manufacture new viral RNA at a high rate. The viral RNA moves out of the nucleus, to the outer cell membrane. Proteins are processed into shorter lengths with the enzyme protease. Immature HIV buds out of the membrane, creating a new HIV virus. This process leaves a pockmark where the HIV viral bud bursts from the T4 cell membrane. The replication of thousands of new HIV cells from the T4 cell eventually kills the T4 cell and releases those thousands of HIV cells to repeat the process with other T4 cells. Through this process, the viral load (number of HIV cells in the blood) increases and the number of T4 cells decreases over time. Because T4 cells play an important role in the sequence of cell-mediated immune functioning, the reduction in T4 cells parallels the decrease in immune function.

HOW DOES HIV CAUSE HIV DISEASE AND AIDS?

Laboratory tests can monitor T4 cell counts. Normal blood levels are 800 to 1200 per microliter (μL) of blood. Over time, HIV replication causes decreases in T4 cell counts. As the level decreases, immune system function also decreases. The impaired immune system fails to respond effectively to other infections, leaving the person more prone to becoming ill from common infections. These infections are OIs because they appear to take advantage of the opportunity of an impaired immune system. Typically, these OIs are significant or life-threatening only in people with impaired immune systems (e.g., newborn babies, elderly people, patients whose immune systems have been impaired by radiation or chemotherapy).

When T4 counts drop below 500, some OIs begin to appear. Below 200, the risk for OI becomes significant. For this reason, a T4 count below 200 in an HIV-positive person is enough to diagnose that person as having AIDS. Alternatively, an HIV-positive person is diagnosed with AIDS when he or she has a T4 cell count higher than 200 and 1 of the 26 defining OIs. The average length of time from infection to development of symptoms of AIDS is about 11 years. This period may be extended with antiviral medications.

The 26 defining OIs are candidiasis of bronchi, trachea, or lungs; candidiasis, esophageal; cervical cancer, invasive; coccidioidomycosis, disseminated or extrapulmonary; cryptococcosis, extrapulmonary; cryptosporidiosis, chronic intestinal; cytomegalovirus disease; cytomegalovirus retinitis with loss of vision; HIV encephalopathy; herpes simplex (chronic ulcers or bronchitis, pneumonitis, or esophagitis); histoplasmosis, disseminated or extrapulmonary; isosporiasis, chronic intestinal; Kaposi's sarcoma; lymphoma, Burkitt's; lymphoma, immunoblastic; lymphoma, primary in brain; *Mycobacterium avium* complex, disseminated or extrapulmonary; *Mycobacterium kansasii,* disseminated or extrapulmonary; *Mycobacterium tuberculosis,* disseminated or extrapulmonary; *Mycobacterium,* other species or unidentified species, disseminated or extrapulmonary; *Pneumocystis carinii* pneumonia; pneumonia, recurrent; progressive multifocal leukoencephalopathy; salmonella septicemia, recurrent; toxoplasmosis of brain; and wasting syndrome due to HIV.

As a person who is infected with HIV continues to lose T4 cells to HIV replication, multiple OIs are likely to develop. Most people with AIDS die of an OI.

HOW ARE HIV AND AIDS TREATED?

Medical intervention for HIV infection, disease, and AIDS begins with the identification of HIV infection. This is done using a lab test to identify antibodies to HIV present in the blood. Because all viruses, including HIV, are very small, it is easier to identify antibodies to the virus than the virus itself. Therefore, the HIV antibody test is used to identify HIV infection. However, this means that the blood test will only identify infection after antibodies have developed, which can take weeks to months. Many HIV-infected people develop antibodies to the virus within 6 weeks, with almost all developing antibodies within 3 months. Nearly 100% of HIV-positive people develop antibodies within 6 months. The period between actual infection and the development of detectable antibodies is known as the *window period.* Because of this window period, a person who is concerned about possible infection must wait to take an antibody test. If the test is negative, the person is generally encouraged to return in several months for another test to be sure that the result is actually negative. Alternatively, a more sensitive test for the actual virus can be performed, a viral load test. This test is more expensive and therefore is usually reserved to monitor known infection and treatment effectiveness.

Originally, HIV antibody tests were performed on blood samples drawn from the arm, with tests performed at a lab taking several weeks to return results. Therefore, people needed to return for their results. These procedures had several barriers to serving the population. Some people are uncomfortable with blood draws. Many who had initially elected to be tested did not return to receive their results. Newer technology has allowed for home collection of a spot of blood for mail-in testing, needle-free tests performed on cells swabbed from inside the mouth, and most recently, doctor's office testing allowing test results to be given within minutes. Nevertheless, these procedures require initiative on the part of the person to find out his or her HIV status. Currently, most people who are infected with HIV, both in the United States and globally, do not know it.

Once a person is diagnosed as being infected with HIV, or as being HIV positive, medical monitoring and treatment may proceed if available and affordable. Monitoring of health status generally includes T4 cell counts in the blood. In addition, viral load may be monitored using viral load tests. High levels of viral load generally parallel decreases in T4 cell counts, marking immune impairment and predicting risk for developing OIs.

As HIV disease progresses, drug treatment may be implemented, if available and affordable. Drug treatment centers on antiviral medications. Antiviral drugs work by interrupting the processes required for the virus to enter the T4 cell and to use the cell to replicate. There are several different types of antiviral medications used to treat HIV disease. The first type of antiviral developed was a reverse transcriptase inhibitor. These drugs interfere with HIV replication in the T4 cell by inhibiting the enzyme reverse transcriptase and the process of turning viral RNA into DNA. The second type of antiviral drug developed was a protease inhibitor. These drugs interfere with HIV replication by inhibiting the enzyme protease and the process of cutting proteins to the appropriate length for creation of new HIV. Drugs designed to inhibit the integrase enzyme and to block the attachment of HIV to the fusin protein are in development. However, current HIV treatment uses a combination of drugs to inhibit viral replication. This approach, combination therapy, cocktail therapy, or more specifically, highly active antiretroviral treatment (HAART), uses drugs of different types. For example, a common combination includes two reverse transcriptase inhibitors and one protease inhibitor. This treatment has been found to reduce viral load below detectable levels in many patients. The virus is not eliminated, and interruptions of HAART lead to rebounds in viral load, but with low viral loads, T4 cell counts have been found to increase. With increased T4 cell counts, OIs are naturally reduced. HIV-positive patients on HAART often return to healthy status. AIDS mortality rates in the United States dropped by 50% following the approval of HAART.

Unfortunately, these powerful medications are costly, are not universally or permanently effective, and have significant side effects. In many developing countries, treatment for HIV is unavailable. Some HIV-positive patients find that HAART is not effective because their HIV virus is a drug-resistant strain. Others may find that over time these mutations develop and their own HIV becomes drug resistant, leading to increased viral load, decreased T4 cell counts, development of OIs, and progression of AIDS. Finally, the medications themselves have some very toxic side effects. For example, recent research has reported a twofold to threefold increase in the risk for heart attack among people with HIV taking protease inhibitor medications for 2 to 3 years.

HOW IS HIV TRANSMITTED?

HIV is transmitted when HIV-positive body fluids that are rich in white blood cells enter the body of an HIV-negative person. Because transmission requires the presence of an HIV-positive person, a spilling of body fluid, and direct entry into an opening of an HIV-negative person, HIV is not transmitted easily or in casual contact. Without direct transmission of body fluids into another person, HIV transmission does not occur. Also, HIV does not live long outside of a human body. HIV transmission is generally associated with four body fluids: blood, semen, cervical-vaginal secretions, and breast milk. For these reasons, caregivers, family members, co-workers, and classmates generally do not need to be concerned about HIV transmission.

Work-site transmission of HIV has only been documented with skin punctures (e.g., needle sticks) or heavy exposure of blood spilled onto mucosal membranes or open wounds (e.g., weeping eczema). Universal precautions, which involve use of protection from exposure to blood and body fluids from all patients, are the standard in health care and prevent HIV transmission.

Transmission of HIV by blood has been mainly associated with untested blood transfusions and sharing of injection equipment by illicit drug users. Donated blood has been universally tested in the United States since 1985. Therefore, HIV transmission by transfusion is largely unknown. HIV is not transmitted to blood donors. Injection drug users (e.g., intravenous heroin users) often share needles and other injection equipment because such equipment is scarce. The reason injection equipment is scarce is that, in efforts to control such drug use, injection equipment has been made available only by prescription (e.g., to diabetics) and is illegal to carry without such a prescription. This means that drug users may share a common set of works or rent the equipment from the drug dealer. In some states, efforts to decrease this mode of HIV transmission have led to more drug treatment, clean needle exchange programs, distribution of bleach and water kits to disinfect injection equipment, and the availability of syringes without prescription in some states.

Transmission of HIV through semen and cervical-vaginal secretions has been the major mode of transmission. Sexual transmission of HIV accounts for most cases of HIV. Historically, the first cases of AIDS identified in the United States were among homosexual men. Globally, however, most cases of AIDS were transmitted through heterosexual contact. In most countries, AIDS cases are equally prevalent among men and women. Prevention of sexual transmission involves abstinence, condom use, and HIV testing and knowledge of status paired with discussion of HIV and prevention with sexual partners.

HIV transmission from mother to child (i.e., vertical transmission) may occur prenatally, at birth, or through breast milk. If a pregnant woman is HIV positive and is not taking antiviral medications, there is a 25% to 30% chance that the baby will be HIV positive. If the mother is treated with even one reverse transcriptase inhibitor, the chance of transmission drops to 8%. Therefore, HIV testing of pregnant women is important in order to initiate antiviral treatment for mother and to protect the fetus. Also, because most babies born to HIV-positive mothers are not HIV positive, transmission through breast milk is an important issue. If a woman is HIV positive and her child is HIV negative, she should not breast-feed. However, in developing countries, formula may be unavailable or too expensive, or the water to mix the formula may not be safe. If a child is born HIV negative to an HIV-positive mother, the probability of this child eventually being orphaned is also significant.

HIV testing of newborns requires the use of more expensive viral load tests because the child's blood will contain antibodies from the mother, including HIV antibodies, even if the child does not carry the virus itself. Therefore, newborns of HIV-positive mothers must either be tested with viral load tests or treated with antivirals during the 18 months that it can take to clear maternal antibodies and develop detectable HIV antibodies reflective of the child's own HIV status. Also, during that period, breast-feeding would increase the risk for virus transmission to a previously HIV-negative newborn.

HOW CAN HIV TRANSMISSION BE PREVENTED?

Work on treatment issues parallels work to prevent HIV infection. Vaccines to prevent HIV disease are in clinical trials, but early results have been unsatisfactory. Risk behavior reduction has been the most effective intervention to date. Significant reductions in transmission have been effected with community-wide campaigns to reduce the riskiest behaviors or to modify them to make them safer (e.g., with condoms or with clean injection equipment). Nevertheless, much remains to be done to reduce the rate of growth, much less eradicate the scourge, of HIV and AIDS worldwide.

Prevention of transmission of HIV through blood has focused on testing the transfusion blood supply. With universal testing of blood products, transfusion-related transmission of HIV has been virtually eliminated. Also, modification of illicit drug use behaviors is an important mechanism for preventing blood-to-blood transmission of HIV. Drug treatment to promote abstinence or replacement of injection drugs with prescription oral medications such as methadone is one way to reduce HIV transmission among drug users. Alternatively, approaches known as *harm reduction,* which focus on reducing risks, even if drug use itself is not reduced, have been effective in decreasing HIV transmission. One harm-reduction approach is to distribute bleach and water kits to drug users to allow them to clean equipment between users. The technique is to flush the syringe with bleach twice and then with clean water twice. It is important that drug users also not share other pieces of equipment such as cookers.

Another harm-reduction approach is syringe exchange programs. These are programs in which injection drug users return used, contaminated syringes and are given the same number of clean syringes. Research has countered concerns about this technique. Critics suggested that drug users would use more drugs or would delay seeking treatment. Critics also suggested that the number of drug users would increase. Research has repeatedly countered these concerns by documenting decreased drug use, earlier treatment seeking, and no increase in the number of drug users. Decreases in HIV transmission have been documented. In addition, some states have made syringes available without prescription in order to decrease the need to share needles and subsequently transmit HIV.

Sexual transmission of HIV is the most common form of transmission. Methods of reducing sexual HIV transmission include abstinence, safer sex (condoms, lower risk behavior, fewer partners), and HIV testing and discussion. Abstinence is the only certain method of preventing HIV transmission; however, it is not an acceptable method for many people. For people who do engage in sex and want to reduce their risk for HIV, health education workers have advocated safer sex. Safer sex methods include modifying sexual behavior to avoid high-risk penetrative sex (vaginal or anal) for a lower-risk penetrative (oral) or nonpenetrative (mutual masturbation, frottage) sexual behavior. Penetrative sex can be made safer by using male or female condoms. Also, the odds of encountering an HIV-positive person may be reduced simply by having fewer partners. Another method of reducing sexual HIV transmission is to engage in HIV testing before engaging in sex with a new partner and to discuss HIV status and prevention before having sex. This requires preplanning, interpersonal skills, and the ability to wait for repeat testing after the period of undetectable infection (3 to 6 months) has passed.

In the event of an unintentional exposure to HIV, either through a needle stick in a health care facility, through a sexual assault, or through a voluntary sexual episode, postexposure prophylaxis has been used to reduce the risk of the exposure becoming an active infection. This technique is to administer antiviral medications for 1 month, beginning within 72 hours after the accidental exposure. In theory, any virus that may have entered the body may be prevented from replicating and therefore never establish itself as an infection able to sustain itself. After a month, viral load testing can evaluate the presence or absence of HIV.

WHAT IS THE HISTORY OF AIDS IN THE UNITED STATES AND GLOBALLY?

In 1981, AIDS was first identified when a number of patients died soon after presenting with a puzzling set of conditions. Previously healthy young men presented to physicians in San Francisco and New York City with *Pneumocystis carinii* pneumonia (PCP) and Kaposi's sarcoma (KS). PCP is a form of pneumonia usually seen only among newborns, the elderly, and cancer patients whose immune systems have been suppressed by chemotherapy. KS is a cancer of the lining of the blood vessels, appearing as purplish lesions on the skin, which normally appears among elderly men of Mediterranean descent, is usually slow to progress, and is generally not fatal. In 1981, it was reported that 41 young homosexual men had presented with these disorders and that 8 had died within 2 years. The Centers for Disease Control and Prevention in Atlanta released this news in the *Morbidity and Mortality Weekly Report* on June 5, 1981. The *New York Times* was the first to publish this news in the lay press on July 3, 1981.

Until 1983, it was not clear what was causing this syndrome of immunodeficiency-related conditions. In 1983, Dr. Robert Gallo in the United States and Dr. Luc Montagnier in France independently reported that the cause of AIDS was a virus. Gallo called the virus *human T-cell lymphotropic virus type III* (HTLV-III). Montagnier called the virus *lymphadenopathy-associated virus* (LAV). There was a dispute about who had made the discovery first. Nevertheless, the World Health Organization (WHO) renamed the virus the *human immunodeficiency virus* (HIV).

Until 1985, there was no way for persons to know whether they had been infected with the virus. Because there is a lag of years between infection and development of symptoms, many people could be transmitting the virus without knowing that they were infected. In 1985, the U.S. Food and Drug Administration (FDA) approved the HIV antibody test. This development allowed people to determine their HIV status.

Many people did not take the HIV test under the rationale that there was no reason to know because there was no antiviral treatment. At that time, treatment focused on symptomatic OIs in attempts to delay

mortality and improve remaining quality of life. In 1987, the FDA approved the first antiviral for treatment of HIV. This medication was a reverse transcriptase inhibitor, zidovudine (ZDV or AZT), marketed as Retrovir. There were equivocal results in tests of the effectiveness of treatment with this medication. There were questions as to whether it extended life. There was evidence that OIs were delayed, even if death was not delayed. This suggested that the medication could provide better quality of life, if not greater quantity of life.

Several other reverse transcriptase inhibitors were developed in the 1990s, but it was not until 1995 that a significantly new type of antiviral medication was approved by the FDA. In 1995, the protease inhibitor saquinavir mesylate, marketed as Invirase, was approved. Subsequently, other protease inhibitors have been developed and approved. Currently, HAART involves multiple medications, usually two reverse transcriptase inhibitors and one protease inhibitor. Combination therapies were approved in 2000, which showed significant effects at reducing viral load, morbidity (i.e., illness), and mortality. In fact, AIDS mortality in the United States dropped by about 50% with the development of HAART. With future developments of fusin blockers and integrase inhibitors, it may be expected that combination therapies may become even more effective.

WHAT IS THE GLOBAL IMPACT OF HIV?

In the United States, there have been 886,575 cases of AIDS diagnosed from 1981 through 2002. Of those, 501,669 patients had died by the end of 2002. Globally, there were about 40 million people living with HIV during 2003. Of those, about 5 million were newly infected during 2003. Worldwide, 3 million people died of AIDS in 2003. It is important to note that HIV and AIDS are not evenly distributed around the world. As of 2003, not only are a large number of HIV and AIDS cases found in sub-Saharan Africa (25.0 to 28.2 million infections) and South and Southeast Asia (4.6 to 8.2 million infections), but also the prevalence of HIV and AIDS is disproportionately centered on certain regions in the developing world. Specifically, the adult prevalence rate is highest in sub-Saharan Africa (7.5–8.5%) and the Caribbean (1.9–3.1%), as compared with North America (0.5–0.7%). Similarly, AIDS deaths have been highest in sub-Saharan Africa, with 2.2 to 2.4 million deaths during 2003. South and Southeast Asia experienced 330,000 to 590,000 deaths in 2003. These were the highest number of deaths, especially as compared with North America (12,000–18,000 deaths) and Australia and New Zealand (less than 100 deaths).

It is important to note that in areas such as sub-Saharan Africa, the high infection, illness, and death rates not only are affecting society as a whole but also are generally concentrated among adults of childbearing age because of the nature of HIV as a sexually transmitted infection. This means that as that cohort is ill and dying, the region is affected by a workforce that is ill and dying and by a generation of parents who are ill and dying, leaving a generation of children orphaned. Workforce productivity, agricultural productivity, and economic vitality are being severely affected by the HIV pandemic.

To respond to the HIV pandemic, these developing nations are significantly limited in their economic ability to provide medical treatment and associated services to people with HIV and AIDS. Therefore, in many of these regions, HIV is left largely untreated, with a morbidity and mortality profile similar to that of HIV in the United States during the 1980s. Specifically, with no antiviral treatment, infection progresses to AIDS unchecked, with a life span of about 2 years after AIDS diagnosis.

SUMMARY AND CONCLUSION

Not only does the economic status of countries or regions interact with HIV and AIDS, but also specific cultural factors within each region are affected. Specifically, factors that interact with HIV transmission and prevention efforts include levels of education in general, HIV education specifically, poverty and the subsequent influence of injection drug use and prostitution, and the rights of women and their freedom and economic viability to self-determination. All these cultural factors are relevant and must be included in the consideration of prevention and treatment efforts. Overall, it is important to consider the scientific and cultural factors relevant to the prevention and treatment of HIV and AIDS in order to implement effective responses to this pandemic.

—Douglas M. Scheidt

See also Immune System, Infectious Diseases, Sexually Transmitted Diseases (STDs)

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ACTIVITIES OF DAILY LIVING (ADLs)

An individual's ability to live independently is often determined by that person's capacity for self-care and ability to engage in various activities of daily living (ADLs). Basic or self-care ADLs include such everyday behaviors as attention to hygiene, bathing, dressing, feeding, and toileting. Complex or *instrumental* activities of daily living (IADLs) include such tasks as cooking and meal preparation, medication administration, financial management, use of communication devices (e.g., telephone), and use of transportation (e.g., driving a vehicle). In older individuals, increasing frailty or declines in cognitive ability are heralded by declines in IADLs followed by declines or disruptions in basic ADLs. Consequently, health care providers routinely evaluate the older individual's level of independence in, versus support needed across, a range of IADLs and ADLs.

ADL functioning may be assessed in three ways: self-report, informant (caregiver) report, or performance of actual ADL tasks. The most common method of ADL assessment is self-report or informant report through informal interview. The individual or primary caregiver (e.g., spouse, adult child) is asked whether the individual requires assistance in any of a range of ADL tasks. Formal self-report questionnaires obtain this information in a standardized way. Lawton and Brody (1969), for example, developed an ADL questionnaire that can be completed either by the individual or by an informant. The questionnaire includes a range of both ADL and IADL behaviors, and the respondent rates each item according to whether he or she is entirely independent in the task (2 points), requires assistance to complete the tasks (1 point), or is entirely dependent on someone else for task completion (0 points). The questionnaire is scored by summing the item responses, with lower scores reflecting greater dependence and need for assistance in IADLs and ADLs. The Older Americans Resources and Services Instrument (OARS), developed for community-based assessment of ADLs in research studies, is similar to the Lawton and Brody measure, although it is an interviewer-administered questionnaire.

Although the self- and interviewer-administered questionnaire method of assessing ADLs is cost-effective and takes little time to administer, the accuracy of this method is dependent on the respondent's honest appraisal or awareness of the individual's true functioning. Research suggests that individuals providing self-report of their own ADL abilities tend to overestimate their functioning, whereas caregivers tend to underestimate their family members' functioning. As such, agreement between self-reports and informant reports may be low, particularly for the more complex IADLs. Disagreements may stem from individuals' overestimates of their own abilities because of lack of awareness of declines or attempts to minimize ADL deficiencies for fear of losing independence. Alternatively, the discrepancies may reflect misestimates by caregivers who have insufficient knowledge of the individual's functioning across the various ADL tasks or from feeling burdened by the care that they already provide to their family members.

Direct performance-based assessment is an alternative method for assessing ADLs that minimizes any biases or inaccuracies in self-report or caregiver report. In this approach, the individual is given a variety of tasks, and his or her performance is rated on

each task based on predetermined criteria. Tasks can include cooking (e.g., making a grilled cheese sandwich, heating up soup), money management (e.g., entering a transaction into a checkbook), and telephone use (e.g., making a phone call and asking for information). Research suggests that performance-based ADL measures are more accurate than self-reports or caregiver reports, and they may be better at determining the individual's level of care needs. The performance-based approach is typically used by occupational therapists in inpatient or rehabilitation settings because these settings provide sufficient time and space to make the detailed observations necessary to plan for the individual's needs. However, few of the performance-based ADL measures used in these settings have been developed for commercial use, and therefore they are not widely available. In addition, this method may be neither suitable nor cost-effective for use in outpatient settings (e.g., a general physician's offices) because of the space (e.g., kitchen setup for cooking tasks) and equipment requirements.

—Emily D. Richardson

See also Older Adulthood

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ACTIVITY THEORY

Human actions are the fundamental phenomena that all theories of knowing, learning, and development aspire to explain. However, most theories do not explain concrete individual actions, but provide probabilistic estimates for central tendencies. Most theories also consider actions as expressions and causal consequences of underlying, hidden social or psychological phenomena. Activity theory, on the other hand, is concerned with understanding real, concrete activity in the very settings where it occurs, based on the grounds individual and collective human agents have for doing what they do. Activity theory therefore aspires to understand and explain each form of action in its concrete material detail, whatever the situation. Because of this orientation, the theory has been in favor with researchers interested in assisting companies and schools in redesigning and changing their everyday work environment. The theory presupposes that structural aspects of a setting mediate activity and that these structures can be understood only by considering their cultural and historical context. A more descriptive name frequently used for the theory is therefore *cultural historical activity theory* or CHAT. Social activities (e.g., fish hatching, teaching, researching), which have arisen as a result of the division of labor in society, are the basic units of analysis in CHAT. The nature of an activity such as *fish hatching* can never be understood by studying it in the abstract, that is, by analyzing the idea of fish hatching; it requires instead the study of the concrete material details of *fish hatching* as a synchronically and diachronically situated system.

HISTORICAL ORIGINS

Cultural historical activity theory has arisen in response to idealism, which splits concrete human activity from abstract thinking. Grounding their work in the dialectical materialist approach of Karl Marx and Friedrich Engels, Soviet psychologists such as Lev Vygotsky worked to establish a theory that could simultaneously account for knowledge as the result of concrete human actions *and* of sociocultural mediation; this is now known as *first-generation activity theory.* Other Soviet psychologists, including Alexander Luria and Alexei Leont'ev, further elaborated this position by including a dialectical relationship between the individual and collective (culture, society); this is now known as *second-generation activity theory.* Their work constituted the basis for more recent, Western European developments: the Finnish scholar Yrjö Engeström developed a structural perspective on activity systems, whereas the German critical psychologist Klaus Holzkamp worked out a theoretical and methodological framework that focuses on a subject-centered perspective of human activity. *Third-generation activity theory* is concerned with understanding and modeling networks of activity systems.

POWER TO ACT, AGENCY

Fundamental to CHAT is the human ability to act or agency. Individual knowledge can be thought of in terms of the action possibilities (room to maneuver) individuals have in concrete situations; an increase in action possibilities constitutes learning and development. Culture and cultural knowledge can then be theorized as the generalized action possibilities, which exist at the collective level—any action, even the most atrocious war crimes, are then concrete realizations of possibilities for which the culture as a whole is responsible. Importantly, existing culture is reproduced and new culture produced in the concrete actions of individuals. These actions always arise from the (dialectic) relation of the social and material (i.e., sociomaterial) structures in concrete settings, on the one hand, and the internal, mental structures (schemas) that enable perception of these external structures, on the other.

Agency and structure are dialectically related; they presuppose one another. Structure exists both as social and material resources and as schemas. The resources and schemas are dialectically related: schemas develop as the newborn individual engages with the world, but the perception of the world requires schemas. New schemas are therefore coextensive with new lifeworld elements available to the individual consciousness. Because of this dialectical relationship, individual development is both highly idiosyncratic, leading to differences in the schema developed, but also highly constrained, given that all individuals interact with the same material structures and cultural practices.

Agency also means that the human subjects of an activity system are not mere responders to fixed external conditions; they are endowed with the power to act and thereby change their conditions. Thus, to take a concrete example, fish culturists and hatchery managers are not merely cultural dopes reacting to external conditions or blindly following rules. Rather, hatchery workers actively contribute to reproducing fish hatching as concrete activity, and they produce fish hatching in new ways and therefore contribute to individual and collective learning and development. However, agency and therefore control over the context are not unlimited. Objectively experienced structures in the hatchery and higher organizational levels constrain what any hatchery employee can do. There are always social and material constraints on actions. Thus, the agency of hatchery employees is dialectical: both subjectively determining and objectively determined by their life conditions. CHAT articulates human learning and development in terms of the *expanding* control over the conditions.

HIERARCHICAL LEVELS WITHIN ACTIVITY

In CHAT, *actions* play a special role because this is what human individuals bring about and what researchers observe. In many situations, feeding fish, uttering a request for more fish feed, or (mentally) adding the number of feed bags to find the total amount of feed distributed in a day are typical actions because they realize conscious goals articulated by individual hatchery workers. An action implies both physical (bodily) involvement—even mental arithmetic requires a human body—and participation in social *activity* (fish hatching). Actions also imply acting subjects and objects acted on. Actions, however, do not constitute the smallest element in the analysis because they are realized by unconsciously produced elements, *operations.* To understand or theorize any moment of human activity, three concurrent levels of events need to be distinguished: activities, actions, and operations.

Activities, Actions, Operations

Activities are directed toward objects, always formulated and realized by collective entities (community, society). Fish hatching is an activity; fish culturists can earn a salary, which they use to satisfy their basic and other needs, because fish hatching contributes to the maintenance of society as a whole. Actions are directed toward goals, framed by subjects (individuals, groups); feeding fish constitutes an action because at any time during the day, fish culturists make conscious decisions (form the goal) to go to the ponds and throw food. Operations are unconscious, oriented toward the current conditions: for example, the current state of the action and its relation to the sociomaterial structures of the setting. Experienced fish culturists do not have to form the goal, "flick the hand to spread the food as widely as possible," but their arms and hands produce the required movements, making adjustments to the amount of food currently on the scoop, wind, distribution of fish in the pond, or weight of the scoop.

It is apparent that in the course of individual and collective development, particular phenomena change levels. For example, at some time in the cultural historical evolution, human individuals who needed

some tool decided to make it—even chimpanzees fashion branches to "fish" termites from their mounds. Later, as part of the division of labor, tool making became an activity in its own right. For example, one hatchery worker fashioned a mechanical feeder from scratch, including a leaf blower. If a company were formed to build such mechanical feeders in large numbers, a new activity system would have formed. A movement in the opposite direction is observed when newcomers to the hatchery learn to feed fish. Initially, the feed thrown with a scoop tends to clump, leading to feed falling to the bottom of the pond, both wasting feed and giving rise to dangerous bacterial growth. The newcomer consciously focuses on flicking the hand holding the scoop to spread the feed as widely as possible—here flicking the hand is an action. But with time, the newcomer no longer needs to consciously focus on flicking the hand, which now has become an operation contributing to realizing feeding fish.

Sense, Reference, Meaning

Activities and actions are dialectically related: actions concretely realize activities, one action at a time, but they are oriented toward the realization of an activity. That is, activities presuppose the actions that realize them, but actions presuppose the activities that they realize. It is in its relation to the activity that an action obtains its *sense:* the sense of feeding fish in a hatchery differs from feeding fish in a home aquarium or feeding fish at the Vancouver Aquarium Marine Science Center. Actions and operations also mutually constitute and therefore presuppose one another: operations concretely realize specific actions, thereby presupposing the former, but actions are the context in response to which operations emerge. Actions therefore constitute the *referents* in response to which operations emerge. The hatchery workers' hand flick operations presuppose fish feeding, but fish feeding only exists in the material details of operations such as filling the scoop, extending the arm, and flicking the hand. It is only in the dual orientation of actions to activities (sense) and operations (reference) that we can talk of *meaning*. An action is grounded both in the body that produces it and in the culture that gives it its sense. Communicative actions (including sentences, words, and other symbols) are meaningful only in their simultaneous relation to collective activity and embodied operations (e.g., unconscious production of words and gestures).

NATURE OF HUMAN ACTIVITIES

Subject and Object

Cultural historical activity theory presupposes human activity (e.g., fish hatching) as its basic unit of analysis. This unit is dialectical in the sense that however we partition it, each part can be understood only in its relation to all other parts. The most fundamental partition that can be made is that between the acting subject and object. For example, to understand the concrete activity of *fish hatching,* we can ask "*Who* is doing the work?" "*What* are they working on?" and "What is the result?" The answer to the first question gives us the subject, individual or group (hatchery personnel); the answer to the second question gives us the object, the raw materials involved in hatchery operations, eggs, milt, and the continuously developing young fish. The result to the third question gives us the outcomes of the activity, for example, "a well stocked river." To understand *fish hatching,* subject and object cannot be understood independently of one another: fish culturists are defined by what they are working on as much as the things being worked on are defined by the fish culturists. Most importantly, activity theory conceives of subject and object as appearing twice: as concrete structures and schemas. To understand a concrete activity (or action), one needs to know how the raw materials appear to the acting subject and what its visions are for the future outcomes.

Motive, Emotion, Motivation

Motivation and emotion are tied to the motive of activity. They do not exist independently from cognition, impinging somehow from the outside. Rather, they are integral to its constitution. Fish culturists identifying with the hatchery, and therefore pursuing its central motive, are also highly motivated in their everyday work. They "go the extra mile." Because of this identification, everything they learn contributes to the development of the hatchery community: every benefit to the collective becomes a learning opportunity for others. Their attunements to the hatchery and to themselves as participants become indistinguishable. Fish culturists who do not identify with the hatchery have as their object (motive) the earning of a salary. Their motive is therefore different, no longer coinciding with the production of fish. These individuals may be disgruntled, work to rule, and dissociate themselves from the collective motive.

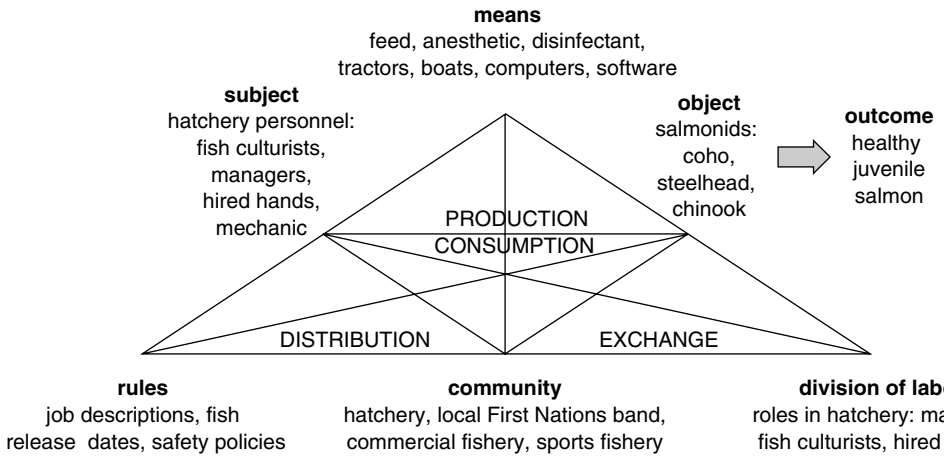

Figure 1 The structure of an activity system, using a hatchery as a specific example.

Identity

In acting toward the object, subjects of activity not only produce outcomes but also reproduce themselves and their community. When hatchery workers feed fish, they reproduce the cultural practice of fish feeding; in the same action of fish feeding, however, they also constitute themselves as members of the hatchery. Identity—who the subject is with respect to others in the relevant community—emerges as the outcome of engagement with the object; that is, as the result of real concrete activity.

STRUCTURE AND HISTORY OF HUMAN ACTIVITIES

Structure of Activity

To study a concrete activity such as fish hatching, researchers begin by articulating the activity and then ask what its constituent structures might be. One commonly used heuristic includes six basic conceptual entities (Figure 1): subject (individuals or groups), object (artifact, motive), means of production (including instruments, artifacts, and language), community, division of labor, and rules. Two points are important. First, none of these six entities can be studied in isolation because in a particular concrete activity, the subject (which schemas are brought to bear) and the relevant object (which material structures are currently relevant) presuppose one another. The scoop for throwing feed is used in ways characteristic of fish hatching practices, which is different from the ways in which scoops are used in other activities. Second, the diagram only presents the system at single point in time. But CHAT has a second focus in the cultural and historical nature of activity; that is, the diachronic aspect of human activity. This aspect is poorly represented in the commonly used heuristic. The activity system as a whole and each of its constitutive parts require an understanding of the cultural historical context.

Analyzing Activity

To understand any particular action observed, for example, *fish feeding,* requires an analysis of the tools that are used (scoop and bucket versus mechanical food spreader), the division of labor (permanently employed fish culturist versus temporary worker), and the nature of the object (different salmon require different amounts of food, different rates of weight increase, different target weights before release). To understand why one fish culturist uses hydrogen peroxide and another one plain salt as a disinfectant, or why one fish culturist uses a product called "MS-222" whereas another uses carbon dioxide as an anesthetic, researchers need to investigate the individual and collective development of these fish culturists and this hatchery. To understand why two fish culturists change the grain size of the feed that they distribute to fish at different moments in time, one needs to understand where they are with respect to their own professional and developmental trajectories (identities). One of them may have learned, for example, to perceive fish spitting out or nibbling feed of inappropriate hardness, size, or composition.

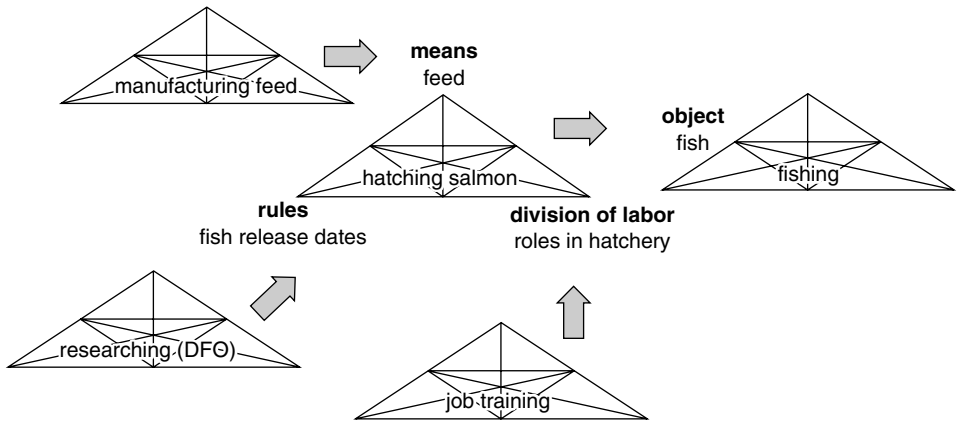

Figure 2 Human society consists of many mutually dependent and constitutive activity systems. This interrelation provides for choices because participation in any of the systems contributes to the collective determination of life, which in turn secures the individual.

Historical Contingency

Whatever happens in the hatchery requires understanding the historical evolution of the hatchery and its larger cultural context, the Salmonid Enhancement Program of the Canadian Department of Fisheries and Oceans. This department has itself undergone changes, such as increased and decreased levels of funding that have mediated the events in the hatchery, and thereby shaped any of its constituent parts, including individual learning and employees' identities. To understand the relative freedom of individual fish culturists to make decisions in their ongoing work of raising fish and their noninvolvement in the decision about when fish are to be released requires careful historical and structural analyses of management–worker relationships and transitions in management over time.

Division of Labor: Society as a Network of Activities

In the same way that an activity cannot be understood apart from its historical context, it cannot be understood apart from its cultural (societal) context. Historically, different forms of activity have evolved through division of labor, which has allowed some people, at some point in history, to hunt or farm and others to produce hunting and farming tools. Through *exchange* (Figure 1), which in early history took place in the form of bartering, game, grains, and tools were exchanged, providing for the needs of all members of a society, who *consume* the fruits of their labor literally and metaphorically. Through such exchanges, economic, cultural, and symbolic capital comes to be *distributed* unevenly both within and between activity systems and between individual (worker, millionaire) and collective subjects (social classes). Today, society consists of complex networks of activity systems. Thus, a fish hatchery is connected to many other activity systems, independent of which the events inside the hatchery cannot be understood—a typical articulation of third-generation CHAT (Figure 2). An increased number of salmon in the local river, estuary, and nearby ocean provides the resources on which commercial fishery depend. It also provides resources for sports fishery, which creates a tourist industry, on which hotels, restaurants, or angling and other shops depend. The participants in the different activity systems can then exchange their earnings for food and shelter, the products of yet other activity systems. That is, participation in fish hatching secures hatchery workers with opportunities to fulfill their needs without having to fish, hunt, gather, or farm. That is, participation in fish hatching frees individual hatchery workers from depending on the conditions in an adverse world and allows them to control their own conditions by participating in the collective control of life conditions.

CONTRADICTIONS

Contradictions are important to CHAT because they are starting points for thinking about and enacting change, which leads to learning and development. Contradictions can be identified within an element, between pairs of elements, between the objects of the

system in its current and more advanced forms, and between neighboring systems. Identifying contradictions within activity systems and how they arise and function generally requires critical analysis. There are two forms of contradictions: *inner contradictions* are those that arise from the unit of activity as a whole, whereas differences, inconsistencies, antinomies, breakdowns, and logical (external) contradictions are expressions of deeper inner contradictions. *External contradictions* mediate (impede) with the activity, but fixing them is equivalent to treating symptoms rather than causes (inner contradictions). Two examples may illustrate the nature of these contradictions. First, verbal utterance "You have to flick your hand like this" and the gesticulations that accompany it express the *same* idea (unit); the difference between utterance and gesticulations is an external expression of an inner contradiction of communication in general. Because utterance and gesticulations are different, they may also express different things. Thus, during human development, words and corresponding gestures may express different ideas, or utterances may lag with respect to the corresponding gestures, giving rise to additional contradictions. Second, graphs used in the hatchery and their corresponding verbal descriptions by a fish culturist express the same ideas but do so in very different ways (material, form). The inner contradiction lies in the fact that each representation is an expression of something without actually being the something (idea).

In workplace and information technology design studies, the identification of contradictions has become an important tool for understanding activity systems, redesigning and changing them, or introducing new tools. All these actions contribute to change and development of and within the system. Contradictions therefore are opportunities for orienting change processes, a reason for the popularity of CHAT in praxis-oriented communities (design, teaching, counseling). But the presence of contradictions is not a sufficient condition for change. Thus, although there were evident contradictions between the fish culturists' and their manager's assessments of fish release dates, these were reproduced year after year without leading to any noticeable change in the decision-making practices. True inner contradictions, however, push the activity continuously ahead. Thus, in his classic study, Karl Marx showed how the inner contradiction of a commodity, externally expressed in the antinomy of use-and-exchange value, was the driving force that made a barter-based society evolve into a capitalist society.

KNOWLEDGE, LEARNING, AND DEVELOPMENT

Knowledge

In CHAT, knowledge cannot be talked about in the abstract. Knowledge does not exist as something out there or beyond the world of appearances. It is better thought of in terms of knowledgeability, always exhibited in the concrete details of practical action. Because of the commitment to activity as unit of analysis, the assessment of what hatchery workers know depends on the context. If hatchery workers are asked to do paper-and-pencil problems, for example, about graphs in general, they no longer participate in their normal everyday activity system but in the researcher's, which focuses on the production of completed problem sheets. Because tools (paper and pencil), object of activity, community, rules, and division of labor differ, the kinds and levels of knowledgeability expressed in the respective actions also differ. If researchers study how the fish culturists use graphs to track the average weight of fish as part of their daily work, they will notice deep understanding and integration of graphs into the work processes. How well the fish culturists do on paper-and-pencil graphing tasks does not predict how well they use graphs at work—results that reflect those that have been observed among research scientists.

The distinction between what is inside and outside an individual's head is no longer useful because actions inherently constitute the interface between inside and outside. Whenever a person does something, it happens both in the world, available to other participants in the activity, and inside, as neuronal event. It may be objected that "thinking," such as mental arithmetic involved in adding 12 and 15 bags of feed, is internal. Vygotsky already pointed to the empirical fact that thinking is inner speech. The underlying processes that eventually allow the person to pronounce the result 27 bags of feed therefore require the same inner processes that previously have been associated with adding numbers aloud in the presence of an elementary school teacher.

Subjectivity and Intersubjectivity

Subjectivity and intersubjectivity are dialectically related. At the very moment that humans utter sentences, they presuppose that others already understand.

The same is true for actions. Humans always have grounds for their actions and attribute similar intentionality to the actions of others. When fish culturists on stand-by report that "5,000 fish died," they presuppose the intelligibility to the recipient of the report. However, what one person knows (that 5,000 fish are dead or that the fish tank was overheating) may not be known to another. These differences arise from the material difference between the subjects and their subjectivities, each of which nevertheless concretely realizes generalized, cultural possibilities (intersubjectivity). That is, although the intelligibility of the news exists at the general level, the specific news (knowledge) is concretely realized in different material bodies, which are therefore forced to communicate to ascertain that they are aligned with respect to their understandings of the current state.

Expansive and Defensive Learning

An increase in individual or collective action possibilities constitutes learning. Increases in possibilities constitute greater control over situations and therefore are inherently motivating—this is expansive learning. There are many instances, however, when individuals learn not because it provides them with desirable increases in their room to maneuver but because they want to avoid punishment—this is defensive learning. For example, fish culturists might take an online course because the managers require it but for which they do not see much use. They would study for the exams only to forget what they studied a short time after. Here, the fear of getting low grades, which might affect not only their career but also future job prospects and other aspects of life, would encourage them to study and (reasonably) do well. They might study but lack inherent motivation.

Individual and Collective Development

Vygotsky introduced the (asymmetrical) notion of *zone of proximal development* to theorize activity and learning when less able individuals achieve at a higher level while working with more able individuals. The zone of proximal development is then the distance between unaided and aided actions. The notion is asymmetrical because it focuses on the learning of one individual rather than on co-theorizing the additional possibilities available to all individuals who participate in collective activity. In CHAT, centrally concerned with the relation between individual and collective, the zone of proximal development is understood as the distance between the everyday actions of individuals and the historically new and culturally more advanced actions within a collective.

In a fish hatchery, there are many jobs that individuals could do on their own, such as capturing a female salmon in a holding tank, killing it, and taking the eggs. However, two or three fish culturists working together are more efficient at doing the job, not just because there are two or three times as many hands for the same actions but also because working collectively, a whole range of new actions become possible. Thus, working alone, an individual would have to attempt to catch a fish with a dip net, a truly difficult task. Working collectively, one fish culturist can use a dip net as a barrier or can step into the holding tank (dressed in a wet suit) and use the body as an additional form of barrier, while the other is "chasing" the fish in the manner a fish culturist would do working alone. Neither action is observed when there is only one person. An expansion of action possibilities constitutes development of the entire activity system. That is, approaching tasks collectively results in situations that provide *new* action possibilities exceeding the sum of individual possibilities. Because the action possibilities have expanded, there are now new possibilities for individual learning, because in the concrete realization of some new action, the individual subject acquires new competencies and thereby expands collective possibilities. To continue with the previous example, fish culturists can now learn how to use their bodies together with dip nets for crowding fish, something they cannot learn when working on their own. That is, because individual and collective stand in a dialectical relationship, individual and collective developments are linked. Each action produces resources that change the totality of resources available to the individual *and* the collective. New resources mean new possibilities to act and therefore are coextensive with development of the collective.

SUMMARY

Cultural historical activity theory is concerned with understanding and explaining real, everyday, situated activity in its concrete, material detail. Its purpose is to provide accounts for the particulars of each action rather than probabilistic description that may not be applicable to any single action or activity. It achieves

this purpose by including all relevant and salient detail. CHAT arrives at a comprehensive picture of human culture by constructing a tight link between individual and collective. However, CHAT is not a master theory, a theory of everything, because it understands itself as the outcome of an activity system: at any moment it is the current provisional and contingent product of a continuously evolving historical process of theorizing practical activity.

—Michael Roth-Wolff

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ACUPUNCTURE

Acupuncture is the medical practice of inserting needles into specific *acupoints* for the purpose of treating disease. Acupuncture is part of a larger body of eastern health care that includes herbal pharmacy, moxibustion, electrostimulation, massage, fitness exercises including Tai Qi and Qi Gong, meditation, and dietary habits. Each of these features of eastern health care can be employed in both the treatment and prevention of disease. The intentional combining of these eastern health care strategies is designed to promote and maintain healthy development.

The first written record of acupuncture comes from 3000-year-old Shang Dynasty hieroglyphic inscriptions on bones and tortoise shells in China. It is commonly believed that development of this medicine in China existed in the Stone Age more than 10,000 years ago. Acupuncture and other medical practices developed in China and spread to Japan, Korea, Vietnam, other Asian countries, and eventually Europe and the Americas. Today, acupuncture and Chinese medicine are successfully employed worldwide in the prevention and treatment of a wide range of diseases.

Acupoints can be found on defined *meridian pathways* in the body. Twelve of these meridians are connected to 12 individual bodily organs. Eight other meridians run defined paths vertically on the front and back midlines and horizontally at the girdle in five other trajectories that do not connect to a particular organ. Through these pathways run currents of energy, referred to as *Qi* in Asian medicine, which well up at particular *points* along the meridian. The acupuncturist can press or massage, heat, charge, needle, or otherwise stimulate a point, which then affects the meridian and organ or region targeted. A needle placed between the second and third lumbar vertebrae for specific acute lumbago (low back pain) is an example of treatment of a particular point. Using leg points on the stomach meridian for rehabilitation after knee surgery is an example of treating the meridian. Needling stomach meridian points and adding moxibustion (heat therapy) for indigestion and stomachache is an example of treating the associated organ. All are

treated by using acupoints found on meridian pathways running through our bodies.

Acupuncture and Asian medicine have historically been used to treat disorders of the day and the place. In the Warring States period in China, the medicine was crafted to address trauma. In the North of China, cold-induced disorders were addressed, whereas in the South, feverish diseases were treated. As time passed, the medicine was adapted to treat such modern issues as radiation sickness and related cancer in post–World War II Japan, and more recently AIDS, hepatitis, and modern viral plagues worldwide. The 21st century has been called the Age of Shen—spirit disorders such as depression, anxiety, and other mental illnesses.

In Asia, traditional Chinese and modern allopathic medicines are routinely combined in hospitals and clinics. This is the future of medicine in the Western world as Asian medicine moves from "alternative to complementary to integrative" status in our prevention and treatment of disease in all of its manifestations.

—Joshua Geetter and Robert March

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ADAPTATION

Adaptation takes place simultaneously, and in many ways, it is a complementary process to organization. Like organization, adaptation is a process that has its theoretical roots in biology, which also reflects Piaget's early training as a biologist. Adaptation is the individual's adjustment to the environment.

The plant and animal kingdom abound with examples of adaptation (also called *adaption*). For example, the female cardinal is colored a dull brown (whereas the male is bright red), so she is minimally conspicuous and in less danger of being killed (a threat to the survival of the species). The beautiful colors of spring and summer flowers attract insects that are part of the reproductive process that takes place through pollination.

Adaptation is a very complex process that involves the modification of the individual or the environment to fit the needs of the individual, and the process of adaptation can be broken down into two complementary processes: accommodation and assimilation. Assimilation is the modification of external experiences to fit existing mental schemas or structures, whereas accommodation is the modification of existing mental structures or schemas to meet new experiences. Assimilation and accommodation are complementary, and both operate simultaneously, yet one can take precedence over the other depending on the demands of the environment or the developmental level of the individual.

—Neil J. Salkind

See also Accommodation; Assimilation; Cognitive Development; Piaget, Jean

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ADDICTION

An agreed upon definition of addiction does not exist among medical and psychological theorists and researchers. The term *addiction* has taken on new meanings as knowledge about the misuse of alcohol and other drugs has progressed and as cultural conceptions of excessive or inappropriate drug usage and behavior have evolved. The concept—not necessarily the term—was first invoked in the description of alcohol problems but has since been applied to other classes of drugs, such as opioids and stimulants, as well as to potentially problematic and "addictive" behaviors that do not involve ingestion of psychoactive substances (e.g., gambling, eating, sex).

In Colonial times, the excessive use of alcohol was viewed as a choice made for pleasure, and repetitive drunkenness earned one the label of drunkard. Heavy drinking was very common, and in fact per capita alcohol consumption in the United States reached its highest levels to date in the mid-1800s. As the Temperance Movement of the 19th century developed

into an abstinence movement that eventually spawned the Prohibition Era (1920–1933), the idea that alcohol use can become compulsive and beyond one's control firmly took root. This emphasis on loss of control and the progression of drinking behavior to harmful levels are essential tenets of the disease model of alcoholism and, by extension, of other addictions as well. The disease model of addiction promotes education about drugs and the addictive process and total abstinence as the treatment goal, and has been the prevailing view embodied by most alcohol and drug rehabilitation agencies for several decades. In addition, Alcoholics Anonymous and the American Medical Association endorse this concept and have been instrumental in developing and promoting this view, although not without challenges from those who think of problematic alcohol and drug use and their treatment as more behavioral and psychological, rather than biological and medical, in nature.

Specific definitions of *addiction* vary in length, specificity, and emphasis. For example, the term has been defined generally as an overwhelming preoccupation with obtaining and using one or more drugs and a tendency to resume use after stopping. Other components of the many definitions available include the notion that usage is clearly nonrecreational and may occur at inappropriate times (e.g., morning drinking) and places (e.g., at work), and that its negative consequences are severe in several domains of functioning and may be felt almost immediately (e.g., hangover) or long term (e.g., liver disease). Traditionally, addiction has meant the most severe form of drug abuse that includes an intense desire or craving (a biopsychological phenomenon) for the drug, physiological tolerance resulting in a need to take more of the drug to achieve the desired effect, and physiological withdrawal symptoms that occur when use of particular drugs is stopped or decreased.

Current conceptions of addiction and problem drug use give more prominence to psychosocial variables and consequences. For example, the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV)* describes criteria for substance use disorders, the most serious of which is labeled *substance dependence.* Criteria for a diagnosis of substance dependence (e.g., alcohol dependence, cocaine dependence, opioid dependence) are met if a person experiences clinically significant impairment or distress, and at least three of the following are present within the same 12 months: (1) tolerance; (2) withdrawal syndrome for a particular substance; (3) substance often taken in larger amounts or over a longer period than intended; (4) persistent desire or unsuccessful efforts to cut down or control substance use; (5) great deal of time spent in activities necessary to obtain, use, or recover from the substance's effects; (6) important social, occupational, or recreational activities are given up or reduced because of the substance; (7) and the substance use is continued despite knowledge of having a recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance. These criteria apply to both licit and illicit substances. Additionally, the diagnosis may be specified further by indicating whether the substance disorder is accompanied by physiologic dependence (evidence of tolerance or withdrawal) or does not include symptoms of physiologic dependence (no evidence of tolerance and withdrawal). Note that the word "addiction" does not appear in these criteria or in any portion of the *DSM-IV* because of the ambiguity and disagreement that the term invokes from researchers, clinicians, and theorists in the field. Some also point out that to describe someone as addicted, or to label them as an "addict," may lead to stigmatization and dehumanization, or refusal on the part of the person to acknowledge the problem and seek help for it. Another area of current controversy involves the question of whether the addiction term and concept should extend to potentially addictive behaviors that do not involve drug ingestion. Does "addiction" to the internet, shopping, gambling, sex, work, exercise, or eating exist? Clearly, negative consequences and personal distress may be associated with these often compulsive behaviors, yet should the cultural popularity and ubiquity of the term compromise behavioral science standards and nomenclature?

Although the "substance dependence" criterion in the *DSM-IV* perhaps most closely captures what is usually meant by addiction, other terms and phrases that signify problems with alcohol or other drugs are commonly used. Terms like *drug (or alcohol) abuse, drug misuse, substance abuse, substance use* and *misuse, alcoholism, polysubstance abuse* or *dependence,* and *chemical dependency* may add to the confusion sometimes experienced by both professionals and laypeople when attempting to describe problems of this type in a shorthand manner. To clarify, it is helpful to view any use of substances as falling on a continuum from nonproblematic usage to combined psychological

USAGE CONTINUUM

Substance use	Substance misuse	Psychological dependence	Psychological and physical dependence

CONSEQUENCES

Benign	Some negative consequences	Chronic negative consequences and high risk for irreversible physiologic impairment or premature death

SUBSTANCE USE PATTERN

Low frequency, duration, and quantity	Increased frequency, duration, and quantity	Continuous or near continuous consumption in high quantities

Figure 1 A Continuum of Substance Abuse

and physical dependence (Figure 1). Other continua that are functionally related to these descriptors characterize levels of harmful consequences and consumption patterns. *Substance use* encompasses ingestion of over-the-counter and prescribed medications and legal drugs such as alcohol. *Substance misuse* includes the unintentional or inappropriate use of medications as well as use of licit or illicit substances for the purpose of getting high or realizing other intended effects. For instance, taking more than the prescribed dose of Percocet, an opioid pain reliever, in hopes of achieving more effective pain relief, is an inappropriate use of a medication. Taking it occasionally only for its euphoric effects would likewise constitute misuse (often the term *abuse* is used in this context, but inanimate objects are said to be *misused* rather than abused). Note that any use of tobacco products or illicit drugs such as cocaine is usually thought of as being misused, regardless of the frequency or quantity used.

Psychological dependence implies a preoccupation with substance use, at least some evidence of uncontrollable desires or urges to use a substance, and an explicit or implicit goal of changing or controlling one's emotions, cognitions, or perceptions through use of the substance. Continuous or heavy periodic (binge) consumption, and significant, negative consequences of using alcohol or other drugs usually characterize those who can be described as psychologically dependent. Harmful consequences may be thought of as being psychological (e.g., depression, anxiety, memory impairment), interpersonal (e.g., conflicts with family), social (e.g., absence of leisure time; withdrawal from normal activities), occupational (e.g., job loss), educational (e.g., academic failures and absenteeism), legal (e.g., criminal arrests; driving while intoxicated), or physical (e.g., liver, lung disease) in nature. As the duration of problematic substance use increases, the negative consequences associated with it tend to become chronic, especially if the disorder is untreated. Seeking and anticipating drug-induced euphoria or other intended consequences is central to the drug-taking experience initially, but may later fade and be replaced by a perceived need to use drugs to feel "normal." *Physical dependence* symptoms, combined with the aforementioned characteristics of psychological dependence, constitute the most severe end of the substance use continuum. Although the presence of tolerance and withdrawal are not necessary or sufficient criteria of substance use problems, they should be considered primary indicators of problem severity because of the medical complications that may occur. For example, seizures, hallucinations, and even death may be associated with alcohol withdrawal syndrome. High levels of tolerance may also result in death from unintentional overdose. Moreover, fear of aversive withdrawal symptoms often drives physically dependent people to maintain their habit, and they are immediately rewarded when drug ingestion prevents these unpleasant effects.

Finally, it should be noted that physical dependence might occur without psychological dependence or the presence of harmful consequences, as is the case with pain patients taking opioid medications.

In summary, the concept of addiction is multifaceted and not easily defined, possibly because of the entanglement of both willful and compulsive behavioral patterns. Perhaps the most pragmatic way to view substance use problems, and other potentially addictive behaviors, is to assess the extent to which impairment in biopsychosocial functioning occurs. Fortunately, a range of moderately effective treatments is available to those struggling with minimal or more severe substance use disorders.

—Robert J. Rotunda

See also Alcoholism, Gateway Drug, Methadone

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ADLER, ALFRED (1870–1937)

Alfred Adler was a physician and psychologist who created the Individual Psychology movement. Adler wrote 19 books and many articles and papers. He gave numerous lectures and demonstrations internationally. He was born in Rudolfsheim, Austria, and he had rickets as a young child. In his later description of the development of personality, physiologic and environmental conditions that increased a young child's felt inferiority were seen as pivotal. He also had an older, healthy, and competitive brother, Sigmund, with whom he experienced intense rivalry for their parents' attention. This struggle sensitized him to the significance of family constellation for the child's developing style of life, which is one of the basic tenets of Individual Psychology. His difficulties with math during his early schooling helped him to understand that teachers should focus on children's assets rather than their deficits. Adler believed that parents should create a democratic and encouraging atmosphere for children in which neither generation nor gender is used to create statuses of above or below. Adler was the first psychologist to acknowledge the significance of power in both parent-child and marital relations. He thought that males and females, as well as adults and children, should be seen as social equals. Children then could be educated to find active and constructive ways to strive for mastery and to develop social interest. Social interest requires a tendency toward cooperation rather than competition and a focus on contribution to others rather than the status of self. He saw all behavior as purposive and believed that behaviors seen as problematic or symptomatic often were mistaken attempts to compensate for felt inferiority and powerlessness. Motives for such behaviors usually remain outside of the awareness of the individual. Adler's most enduring contributions to child development have been in the areas of parent education, teacher training, and psychotherapy. One of the most widely utilized programs for parent education, Systematic Training for Effective Parenting, is based on the principles of Individual Psychology. He believed that "anyone can learn anything" and developed teacher training approaches to provide the understandings and skills needed by educators to create classroom environments that were democratic and encouraged children's self-confidence. He moved psychotherapy with children from an approach of working with the individual child to one that involved working with both with the child and parents. His founding of child guidance centers had international impact and greatly influenced contemporary approaches in both the training and practice of psychotherapists.

—Priscilla W. Blanton

See also Ego

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ADOLESCENCE

Adolescence is the transitional period of growth, development, and maturation that begins at the end of childhood (about 10 years of age). The onset of puberty can begin as early as age 8 or as late as age 15 in girls and as early as age 9.5 years and as late as age 15 in boys. It is the defining marker of the start of adolescence. The end of adolescence generally occurs between the ages of 17 and 21 years and is marked by the individual reaching full physical and developmental maturity or young adulthood. This developmental phase involves significant physical, hormonal, cognitive, emotional, and social changes. A neurodevelopmental perspective of adolescence holds that most changes occur occurs in three overlapping stages: early, middle, and late. Early adolescence marks the onset of puberty, middle adolescence is characterized by peak growth and physical maturation, and late adolescence marks the end of puberty and the integration of all functional skills. The concept of adolescence is primarily a product of Western culture where youth are viewed as needing a time to mature from being children to taking on the responsibilities, values, and norms exhibited by the adults in their culture.

DEVELOPMENTAL PROCESS

A neurodevelopmental view of adolescent development involves examining how the human grows and matures with respect to the component skills necessary to perform various age-appropriate tasks. Those components are referred to as the *functional domains.* The developmental or maturational process of youth occurs across several distinct functional domains, is not always even, but is sequential; however, there is individual variation in the manifestation of that process. The skills learned and mastered are commonly divided into several functional domains: physical, motor, visual, auditory, perceptual, language, cognitive, psychosocial, and specific integrative-adaptive. All basic skills in these domains are mastered by the end of childhood in the normally developing individual. Physical and psychological trauma, as well as deficits in any of the functional domains, can impede normal development.

Physical Growth and Development

The physical growth of young adolescents involves significant changes in the height, weight, and brain development that are exceeded only during two other time periods: when the fetus is in utero and between the ages of 1 and 3 years. Although 75% of brain growth (in weight) has developed by age 2, the process of central nervous system maturation takes place over a lifetime.

Motor Skills Development

The motor skills domain includes all fine and gross motor skills. Fine motor skills include precise, specific, and fine neuromotor responses such as pincer grasp and the ability to write legibly, cut paper designs with scissors, button, fasten, sew, draw match-to-sample designs, and control motor responses (i.e., tics, tremors, fidgeting, jerky motions, uncontrolled motions). Gross motor skills usually refer to whole body movement, including coordination of skeletal muscles, postural control, balance, coordination of motor planning, agility, muscular strength, and endurance (examples of such skills include the ability to hop, skip, jump, walk, run, crawl, walk a balance beam, walk a straight line toe to toe—forwards and backwards—throw, catch, and hit an object with another object).

Visual Skills Development

Visual skills include visual acuity, the ability to make discriminations between visual stimuli, the ability to track moving or still objects, color vision, extraocular muscle control, which includes resting balance of the eyes, control of eye movement, and visuomotor coordination (looking in different directions and seeing).

Communication Skills Development

Auditory Skills Development

The auditory domain refers to an individual's ability to have "normal" hearing acuity, the ability to

process what one hears, and the ability to employ selective discrimination of sounds and auditory cues.

Language Skills Development

The language domain skills (or the ability to communicate) involve two major areas: receptive and expressive language skills. Receptive language is the ability to understand spoken, signed, or written language and the ability to discriminate meanings and understand semantics and syntax. Expressive language refers to the ability to communicate effectively through spoken, signed, or written language.

The resultant neurobiological changes in childhood and adolescence are immense. For example, changes in the brain dealing with speech and language skills accelerate and peak in early adolescence; acquisition skills for a second language diminish after that.

Cognitive Skills Development

Cognitive skills refer to multiple facets of brain function including (1) the ability to pay and sustain attention that is required to focus selectively and generally on events, actions, and information in the environment; (2) the ability to be alert, which involves mental processing speed, and the ability to respond effectively to environmental cues and stimuli that cause or allow appropriate behavioral adaptation, which facilitates optimal positive outcomes and minimizes negative outcomes; (3) the ability to employ memory skills that include acquiring, storing, and recalling information; (4) the ability to use thinking skills, which means that the individual has knowledge of specifics (store, recall, retrieve), is able to comprehend information (oral, written, and through all senses), and can apply, analyze, synthesize, and evaluate that information; (5) the ability to solve problems and make decisions; and (6) the ability to perform multiple cognitive and functional tasks simultaneously.

Perceptual Motor Skills Development

Perceptual motor skills refer to the ability of the individual to experience a stimulus, process that information in the brain, and employ specific cognitive skills to determine the correct response and then execute the response. Such action requires the integration of stimulus-specific responses from the functional domains, such as visuospatial discrimination, which includes (1) eye–hand coordination, (2) stereognosis, (3) judgment of speed, (4) discrimination of the direction of the movement of people or their body parts or objects, and (5) spatial orientation of moving objects. Additional perceptual motor skills include temporal sequencing (the awareness of sequential ordering; awareness of time and sequence of events), proprioceptive sense, kinesthetic sense, and reaction time (time elapsed between stimulus perception and initial neuromotor response). Successful maturation of this domain means that the individual is able to synthesize all the other domains (physical, cognitive, visual, language domains), which results in the adolescent having the ability to perceive, interpret, plan, and execute an appropriate neuromotor response to stimuli in the environment, and includes coordination, balance, agility, reaction time, and visuomotor responses. Because the perceptual and motor systems are mutually calibrated, any actions by the adolescent are constantly being fine tuned. The ability to see, hear, think, and move are important but are significantly affected by a person's level of perceptual motor development. This ability begins at birth—children begin to learn to coordinate and integrate their physical, cognitive, visual, auditory, and language skills from birth. Being able to perform the basic motor skills but not being able to plan complex motor functions and not having a well-developed visual skill of tracking can result in awkward or clumsy behavior.

Psychosocial Skills Development

Psychosocial skills include the emotional and social functional skills required to allow an adolescent to cope with others and how he or she perceives the world emotionally. Emotional skills include the adolescent's ability to exhibit emotions appropriate to situation or circumstances, the ability to monitor emotion, and the ability to regulate emotions. Social skills include the ability to initiate, develop, and sustain friendships; the ability to develop healthy interpersonal relationships with others; the ability to establish and maintain mutually beneficial intimate relationships; the ability to be empathetic; and the ability to be altruistic. Social skills also include the adolescent's ability to adopt the moral values of his or her culture and of the greater society. Youth who are moral can use appropriate judgment to discriminate right from wrong and develop a sense of morality.

Integrative and Adaptive Skills Development

The final functional domain is the task-specific integrative and adaptive skills development domain. This domain involves the ability to coordinate, integrate, and adapt various domains to meet the specific demands of a given task or situation.

DEVELOPMENTAL STAGES OF ADOLESCENCE

Rational for this Perspective

Addressing adolescent development from a neurodevelopmental perspective helps one to understand the complexities of the maturational process of normal growth and development. Although this section is geared toward normal development, it is easier to realize how deficits in one functional domain can affect the function of other domains. During the first 10 years of life, most of the changes in the developing human evolve around physical, visual, motor, and language development; skills acquisition is the primary focus. During adolescence, new skills are acquired, but the focus shifts to refinement and expansion.

Adolescents who experience normal development will be able to integrate all functions of each domain and use those skills to successfully adapt to the demands of the environment in which they live. Youth who experience the complex process of maturation and growth normally achieve mastery and integration of these processes by late adolescence (ages 17–21 years).

Early Adolescence (Ages 10–14 Years)

With the onset of puberty, most adolescents begin to experience a physical growth spurt and begin sexual maturation resulting in significant changes across all domains of function. Some youth experience a "disconnect" between what they are experiencing developmentally and where they are placed in the school setting. There are often major differences across all domains between the abilities of a 10 year old and those of a 14 year old; additionally, because these youth are experiencing other transitions (e.g., going from elementary to middle to high school), they have to adjust to these environmental issues at the same time they are adjusting to biologic and physiologic changes.

Physical Growth and Development

The onset of puberty causes the adolescent to gain 25% of his or her final adult height (up to 10 cm per year), gain 50% of the ideal adult body weight; experience the doubling of major organs, maturation of facial bones, decrease in lymphoid tissue, genital maturation, primary and secondary sex characteristics, and central nervous system (CNS) maturation, triggering a rise in sex hormones including adrenal hormones, estrogen (female hormone), and testosterone (male hormone). The most significant physical changes of puberty involve a sequential increase in the genital system and secondary characteristics. These changes occur over a 2- to 4-year period resulting in height velocity peak and growth of pubic hair. Females begin to develop breasts (thelarche), grow axillary hair, and menstruate. Males experience growth of pubic hair (pubarche), early testicular and penile growth, nocturnal emissions, marked voice changes, facial hair growth, and muscle development. It is not uncommon for girls to be taller and heavier than boys of the same age during early adolescence.

Brain Growth and Development

In addition to physical growth, the young adolescent undergoes CNS maturation without increase in brain size. The developing brain consists of billions of cells that are in place (by late fetal life). Neurological insults in early adolescence can have a major adverse impact on later development exposure to infections and toxins. Additionally, effects of these insults to the brain can be observed in young adolescents who were exposed to infections and toxins that damaged their brains in utero.

Other threats from the environment that can cause considerable brain injury result from violence exposure, malnutrition, poverty, and the adverse effects of chronic stress. Some experts hold that the developmental period of early adolescence offers a window of opportunity to repair damage or deficits in brain functioning or neurocortical connections. They offer that the brains of adolescents at this stage of development are repairable and say that because of the *plasticity* of brain tissue, brain cells have an astonishing capacity to adapt to changes and challenges that occur throughout life. Interventions designed to stimulate various functions of the brain may improve or influence the interconnectedness of brain cells or brain circuitry. Such environmental stimulation is also important

because the young adolescent is undergoing profound CNS changes. Therefore, there are still enough redundant functions to allow for retraining of the brain to develop skills using previously unused portions of the brain in adolescents who may have suffered some types of brain injury.

Motor, Visual, and Auditory Development

All basic gross motor skills are developed by this stage. Youth are better able to maneuver their fine motor skills. Visual acuity, discrimination, tracking, color vision, and extraocular muscle control are all fully developed as youth enter this stage of development.

Auditory Development

The ability to hear is present at birth but is refined and fully developed by the end of this developmental stage. Components that contribute to this refinement are acuity, the ability to selectively process and discriminate between sounds, and the selective discrimination of written language.

Perceptual Motor Development

Basic perceptual motor skills such as those that allow for integrated stimulus-specific fine motor and gross motor responses, visuospatial discrimination, eye–hand coordination, and stereognosis are developed at a basic level by age 10 or during childhood. Maturation results in refinement of those skills and improved judgment of speed, direction, and spatial orientation of moving objects.

Language Development

All basic receptive and expressive language functions are in place. Further development, practice, exposure, and training result in improved language and communication skills.

Cognitive Skills

These youth are beginning the cognitive refinement process. Although most young adolescents still engage in "concrete" thinking ("here and now," "right or wrong," "black or white"), their ability to perform more complex mental tasks (thinking skills and problem-solving skills) is increasing. They have a clear sense of justice, know right from wrong, and may have an awakening sense of morality and altruism. However, they cannot project future outcomes nor always see abstract relationships between their behavior and potential risks. They have improved mental processing speed and alertness, longer attention spans, and better judgment. They are beginning to understand the purpose of the rules they learned earlier. They understand and can apply factual knowledge to familiar situations but may not be able to apply that knowledge to unique or different situations. They can understand and answer more complex questions as their vocabulary increases and their ability to distinguish between the similarities and differences improves; they can complete simple analogies and are beginning to develop inductive and deductive reasoning abilities. They are able to adopt another person's spatial perspective with ease and can describe the arrangement of objects from another person's point of view. They are developing prepositional logic in which they can think about thinking itself. These adolescents are also able to enjoy and take pride in increasingly complex accomplishments, which positively contributes to developing and strengthening a healthy self-image. Their difficulty with futuristic thinking affects their ability to think about the consequences of their behavior before they act. They often engage in "magical thinking" or the belief that they have unique powers that will protect them from harm. Therefore, they are at increased risk for accident-related morbidity and mortality.

Psychosocial Development

Emotionally, because they are preoccupied with the rapid physiological changes of puberty, these young adolescents may experience feelings of confusion and worry about what is happening to them. They may seem forgetful, distracted, moody, and hypochondriacal, often complaining about body aches or pains. They generally know it is not okay to make fun of others in public. They can control their anger or hurt feelings when they cannot get their own way, are teased by siblings or peers, or are rejected by others. Many adolescents begin to experience emotional distress and conflict when they are trying to decide whether to follow the values of their peers or their families. However, the approval and support from family (especially parents) remains a crucial feature

of their healthy development and resilience. Socially, they have a clear sense of their own body image and social standing with their peers; they can accurately discriminate between peers who are popular or "smart" and those who are not. Although most young adolescents do not engage in unhealthy behaviors, too many do. The outcome of such experimentation can result in a significant level of morbidity and mortality.

Socially, developing and maintaining peer relationships and cognitive skills to cope with emotions and social situations are crucial during this stage of maturation. Friendships tend to be one at a time or with unisexual cliques; peer acceptance is of increasing importance and influence. Because they are keenly aware of their own body image and are sensitive to the criticism of others, the high incidence of bullying and teasing that occurs at this age can have a significant impact on how the young adolescent feels about himself or herself and responds to his or her environment.

Parent–Adolescent Relationships

Parents may frequently be perplexed by their adolescent's rapid mood changes, secretiveness, challenging, telling lies, or refusal to give straight answers. Because the young adolescent is experiencing so many simultaneous changes (physical, hormonal, biological, emotional, and social), it is essential that parents, teachers, and other care providers be patient and help guide them through techniques to manage their emotions, helping them expand their critical thinking and problem-solving skills. In this manner, these youth can learn conflict resolution and self-soothing skills that will allow them to manage their distress and family conflict while improving their self-confidence.

Middle Adolescence (Ages 14–17 Years)

The middle stage of adolescence spans ages 14 to 17 and encompasses the middle school (8th grade) and high school years.

Physical Development

Most adolescents experience continued increases in specialization of gross motor skills, muscle mass, strength, and cardiopulmonary endurance. Some adolescents may find it difficult to adjust to the somatic growth spurt, which may result in temporary clumsiness or awkwardness. Some youth may become very concerned about their normal increases in body weight and size. This may result in excessive dieting and exercise, purging, or other pathogenic weight control measures.

Motor, Visual, and Auditory Development

All skills in these domains are fully developed at the end of middle adolescence, with the exception of the pincer grasp, which continues to develop in late adolescence. As with other domains of function, however, practice and training can further refine these skills.

Language Development

By the end of middle adolescence, youth have mature language skills and can improve on their language abilities with training and practice.

Cognitive Development

Cognitively, these youth can independently weigh consequences of their decisions before taking action; they can engage in fantasy, develop theories about life, and think about what they would like to do when they become adults. Their ability to engage in inductive and deductive reasoning is expanding.

Perceptual Motor Development

All perceptual motor skills are fully developed by the end of this stage. Practice and training can help further refine such abilities.

Psychosocial Development

Although most adolescents move through this developmental stage with minimal distress and problems, some struggle with fluctuating moods and emotions, the impact of which ranges from transient to debilitating. Some youth begin to develop unhealthy behaviors related to weight control practices, eating disorders, substance or alcohol use or abuse, questions about their sexual identity, or sexual activity.

Although these youth have the language skills and cognitive skills to solve problems, rationalize, and understand what is happening to them, they do not have the life experiences to know that their distress is temporary and transitional. This lack of experiential knowledge and coping skills could result in the adolescent running away from home, attempting suicide, engaging in self-mutilation, failing school,

or engaging in other high-risk behaviors.

These adolescents may know and understand the consequences of risk-taking behaviors, but their caution may be overridden by their stronger need for popularity and peer recognition. Such negative adaptations may present significant problems for some adolescents. They may become preoccupied with comparing their physical characteristics with peers', and thinking about sexual relationships may occupy much of their time. As adolescents consistently experience success, they tend to develop a positive self-image and increased confidence. Because of their limited life experiences, adolescents may remain highly sensitive to negative comments from others, peer rejection, bullying, and traumatic personal experiences. As these youth begin to date and have increased sexual desires, they may have sexual fantasies. Some youth will fantasize about same-sex peers and become very disturbed over these events. They may need reassurance that this does not denote sexual orientation. Other youth are beginning to clearly know their sexual orientation. Youth who realize they are gay, lesbian, bisexual, or transgendered may begin to experience mental distress in reaction to fears of being discovered and rejected by their family and peers. Youth who are older or younger than their grade peers may experience psychosocial and emotional problems. Violence and substance use or abuse may become prominent parts of the lives of some youth, increasing their risk for pregnancy, substance abuse, academic failure, injury, or even death (Table 1).

Table 1 Behaviors That Increase the Risk for Morbidity and Mortality

Characteristics
Being male (especially 15–19 years old)
Being a minority (except for suicide and sports injuries)
Being obese
Having a chronic or physical illness
Being older or younger than peers
Behaviors
Not wearing a helmet when riding on a motorcycle or bicycle, skateboard, etc.
Riding with a driver who had been drinking alcohol
Driving after drinking alcohol
Spending increased amounts of time with peers and strangers
Dating (which may result in being forced to engage in sexual activities or being physically abused)
Using tobacco (i.e., cigarettes, cigars, smokeless tobacco)
Using or abusing substances (e.g., marijuana, cocaine, inhalants, injected drugs, steroids)
Engaging in dieting behaviors to lose or control weight (i.e., restricted caloric intake, bingeing, purging, excessive exercise)
Engaging in sexual activity (including oral, anal, or vaginal sex), which can result in sexually transmitted diseases, pregnancy, or early parenthood
Being bullied or a bully
Physical fighting
Carrying a weapon
Attempting suicide
Committing homicide
Engaging in criminal activities
Belonging to a gang

Parent–Adolescent Relationships

During middle adolescence, youth continue to develop their independence from parents and authority figures. Adolescents now begin to rely more and more on peers as their frames of reference. They use peer feedback to set personal goals and rules of conduct. They are capable of multiple relationships. Their feelings are often very intense and may increase their tendency to engage in risky behavior, argue, or challenge authority.

Emancipation

Adolescents at this stage of development have the requisite skills to recognize and understand the demands of a particular academic activity, field of study, social endeavor, or sport and can decide whether they want to engage in the necessary behaviors to meet those requirements. Exposure to multiple exploratory activities that are healthy will improve the adolescent's opportunities to be successful and understand personal needs, desires, and limitations (Table 2). Issues related to sexuality, substance use, and healthy lifestyle need to be clearly and directly addressed by parents. It is important that parents remember that they retain considerable influence over their adolescents so that they do not give up on their children.

Table 2 Promoting Characteristics to Develop Resilient Youth

Youth who seem to resist peer pressure, violence, drugs, and juvenile delinquency share the following characteristics:

Individual Characteristics

These youth are:

- Socially competent
- Responsive
- Capable of caring attitudes
- Flexible

These youth have the following well-developed cognitive skills:

- Abstract thinking
- Conceptual and intellectual thinking
- Communication
- Planning and goal setting
- Problem solving

Emotionally, these youth have a positive attitude and a good sense of:

- Humor
- Autonomy and independence

These youth also have the following attributes:

- Impulse control
- Hope
- A future orientation
- High self-esteem

Environmental Conditions

Strong support systems
Consistent living and educational conditions

Late Adolescence (Ages 17–21 Years)

During this stage of development, adolescents are facing high school graduation, placement tests, and often college or career selection activities. They are expected to make major decisions about the rest of their lives. By the end of late adolescence, most youth reach full physical, cognitive, social, and emotional maturity, and most issues of emancipation are essentially resolved.

Physical Development

Specialization of gross motor skills, gains in strength, and aerobic capacity are fully developed; however, some adolescents may continue to develop speed and increase in size; these changes occur at a slower rate compared with during middle adolescence, and females continue to accumulate fat mass. Their vision is fully developed.

Cognitive Motor Development

These youth engage in more complex cognitive skills. Abstract thought has been established, empathy skills are well developed, and personal values are clearer and well defined. Youth are able to process and make adult decisions, are future oriented, and perceive, set, and react on long-range options and goals. They have the cognitive ability to understand and remember strategies for most academic, sports, and life endeavors.

Psychosocial Development

These youth are continuing the process of emancipation and their significant symbolic movement away from home. Some adolescents seek employment, move away from home, and become financially independent. Others go to college and only temporarily move from their parents' home and continue to be financially and emotionally dependent on their parents. Other youth may choose some combination of these two scenarios. Adolescents in the late stages of development are beginning to resolve conflicts between themselves and their parents. At this stage, youth should have developed an acceptable body image and gender role. They continue to develop their ability to function independently and are less influenced by peers; now they can think independently and use their own judgment for setting personal rules. They are more actively participating in sexual experimentation, are able to be altruistic, and can initiate, develop, and sustain intimate relationships. Their relationships with romantic partners are less narcissistic and more geared toward mutual respect and gratification. They prefer the association with groups and couples and prefer intimacy versus isolation. Most adolescents at this stage of maturation have developed a strong sense of personal identity.

SUMMARY

A neurodevelopmental perspective of adolescence holds that it is a transitional period of growth, development, and maturation that begins at the end of

childhood and ends with entry into adulthood (about between the ages of 10 and 21 years). The onset of puberty signals the start of adolescence. The end of adolescence is marked by the individual reaching full physical and developmental maturity or young adulthood. As adolescents matriculate through this phase of life, they experience significant physical, hormonal, cognitive, emotional, and social changes. These changes occur in three overlapping stages: early, middle, and late adolescence. Early adolescence marks the onset of puberty, middle adolescence is characterized by peak growth and physical maturation, and late adolescence marks the end of puberty and the integration of all functional skills. Youth who experience normal growth and development phase through these stages with minimal problems and emerge a fully functioning member of society.

—Helen D. Pratt

See also Bar/Bat Mitzvah, Puberty, Quinceañera

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ADOPTION

Adoption is a complex family form that touches the lives of many. In a national survey of adoption attitudes conducted by the Evan B. Donaldson Adoption Institute, 64% of respondents indicated that a family member or close friend had either been adopted, had adopted, or had placed a child for adoption. Despite the large numbers of people who have a connection with adoption, there is no current attempt to collect one comprehensive national data set that includes information about public, private agency, and independent adoption. The Adoption and Foster Care Analysis and Reporting System (AFCARS) tracks children adopted from foster care, and the State Department tracks international adoptions through the record of orphan visas issued each year. The most comprehensive figure for the number of total adoptions in the United States is provided by the 2000

Census, which for the first time included the category "adopted son or daughter" and places the number of adopted children under the age of 18 at 2.5% of the population. This number is a broad estimate because it encompasses a wide range of adoptions, including adoption of stepchildren, biologically related and unrelated children, and domestic, international, independent, and informal adoptions. The lack of a comprehensive system for collecting reliable adoption data hinders the accurate reporting of adoption statistics.

BECOMING ADOPTIVE PARENTS

Prospective adoptive parents encounter experiences unique to adoption. David Brodzinsky and Ellen Pinderhughes delineate five tasks associated with becoming an adoptive parent. First, adoptive parents require the approval of others to become parents. An in-depth evaluation called a *home study* is a legal requirement to adopt in every state. This process requires prospective adoptive parents to open themselves to the scrutiny of social work professionals as to their adequacy for parenting. Despite the educational and supportive intent of the home study, it can feel evaluative in nature, producing anxiety that one may not be found adequate. Second, there is the period of time during which consent for the adoption is given, parental rights of the birth parents are terminated, and adoption finalization occurs.

Third, adoption is characterized by an uncertain timeline for achieving parenthood. The process can take from a few months to a year or longer. Waiting for their child to join the family can be a frustrating experience for prospective adoptive parents. Fourth, although favorable opinions about adoption are increasing, adoption is still characterized by social stigma. Although adoptive parents are satisfied with their decision to adopt, they and their children must cope with the negative attitudes of some that adoption is a "second best" route to parenthood. Families formed across racial or national lines may encounter additional prejudices. Finally, adoptive parents have fewer adoptive parent role models to turn to for advice, especially advice related to the unique challenges of raising adopted children.

TYPES OF ADOPTION

There is no one description that can characterize adoption. Adoption is no longer limited to a married couple adopting a same-race infant whereby confidentiality between birth and adoptive families is paramount. Adoptive families reflect the diversity of family forms found in society. Kinship adoption (adoption by a nonparent relative or stepparent) is a prevalent way of forming adoptive families. Although there is lack of precision in available data, the National Adoption Information Clearinghouse reports that kinship adoptions are the slight majority of adoptions in the United States. Despite the preference for married couples by adoption agency staff, birth parents, or both for nonrelative adoptions, single-parent adoption has increased in prevalence. Single parents have a greater likelihood of adopting special needs children for whom finding a permanent placement may be more difficult. There are also a small but growing number of adoptions by gay and lesbian couples. Controversy surrounds this practice, with some states banning gay and lesbian adoption, whereas the Child Welfare League of America asserts that gay and lesbian couples should be assessed the same as any other adoptive applicant.

Permanency planning for children in the child welfare system for whom reunification with a biological relative is not possible has increased the number of adoptions from foster care. Most recent estimates for fiscal year 2001 indicate that 18% of children who exited from foster care were adopted, up from 14% n 1998. There is a higher proportion of children adopted from foster care with physical, behavioral, or emotional disabilities, and as such, financial subsidies are available to adoptive families to provide medical, maintenance, and special services to their children. International adoption has continued to rise, with more than 21,000 children adopted from other countries in fiscal year 2003. During this period, the largest number of children were adopted from China (6,859), followed by Russia (5,209), Guatemala (2,328), and South Korea (1,790). *Transracial adoption,* defined as racial or ethnic minority children adopted by white parents, can be further differentiated into domestic and international transracial adoption. In general, research indicates that both domestic and international transracial adoptees are psychologically well adjusted and engage in active exploration of their racial and cultural identities.

DEVELOPMENTAL ISSUES RELATED TO ADOPTION

Two important developmental issues related to adoption are attachment and the development of an

adoptive identity. A common assumption is that since an adopted child's first attachment is not to the adoptive mother, the mother–infant attachment in adoptive families is less secure. The research support for this assumption is equivocal. Some feel that early attachment disruptions can prolong the initial adoptive mother–infant attachment process, yet others view attachment as a developmental process that allows relationships to stabilize and change over time, thus allowing secure adoptive-parent attachments to occur.

Adopted adolescents have an additional layer of complexity related to the development of a personal identity. They must incorporate how being adopted influences how they view themselves. Adopted adolescents do think about their adoptive status, as evidenced by the responses of adopted teens in a national survey conducted by the Search Institute: 27% endorsed the statement "adoption is a big part of how I think about myself," and 41% said they thought about adoption at least two or three times per month. Integrating adoptive status into their identity is crucial because it allows for the construction of a narrative that explains, accounts for, or justifies their adoptive status.

OPENNESS IN ADOPTION

Openness in adoption describes the amount of contact between adoptive and birth families. It can be placed on a continuum with confidential adoption at one end and fully disclosed at the other. Mediated adoption is midway on the continuum. Fully disclosed adoption describes direct, ongoing communication between birth and adoptive families, which can include face-to-face meetings. Confidential adoption is characterized by the absence of communication between adoptive and birth families, with information shared at placement being nonidentifying. Mediated adoption is characterized by the communication of nonidentifying information through an intermediary, often the adoption agency. There has been movement toward greater openness in adoption in response to birth mothers' desire for continued contact, the need for adopted people to understand their past, older children who know and remember their birth parents being adopted, and the adoption of sibling groups. In response, most adoption agencies currently incorporate openness into their adoption practice. After placement, changes in openness can be influenced by the desires of the adopted person, by adoptive and birth family dynamics, and by the amount of available information. Most adoptive families will at different points consider whether more contact is desired. In general, openness is a dynamic process that can work in both infant and older child placements when adoptive parents, birth parents, and adoptees work together to communicate in a manner that meets the information and relationship needs of all involved.

Search and Reunion

For those adopted people who do not have direct contact with their birth families, curiosity about one's adoption may lead them to search for members of their birth family, particularly their birth mothers. Not all adopted people desire to initiate a search, but many do. Thinking about searching can begin in adolescence when approaching adulthood makes searching legally possible. Gretchen Wrobel, Harold Grotevant, and Ruth McRoy studied a group of 93 adolescents with varied amounts of openness, and found that satisfaction with the amount of adoptive openness was negatively associated with adolescent search intentions and that those with more information about their birth parents had a higher desire to search or had actually done so. Adult searchers are most likely to be women, 25 to 35 years old, white, married, and placed in their adoptive families earlier than nonsearchers. Most of those adults who reported contact with their birth mother after a search describe the experience as positive, resulting in satisfaction with information received and a better sense of self. Currently, in contrast to earlier perspectives, search intentions and actions for both adults and adolescents are not viewed as resulting from problematic relationships in the adoptive family.

CONCLUSION

Our understanding of adoption has changed considerably in the past 20 years. Adoptive families are complex, reflecting the many family forms found in society. Children join their adoptive families from a variety of backgrounds: they may have been born in another country, have experienced foster care, be of a different race or ethnicity than their adoptive parents, or already have ties in the kinship system. Adoptions also vary by the amount of contact and communication between birth and adoptive families. The multifaceted nature of adoption requires that the adopted

person be understood within the unique context of his or her own adoption. As adoption practice and policy continue to evolve, so will our understanding of adoption.

—Gretchen Miller Wrobel

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ADVANCE DIRECTIVES

Advance directive is the general term used to describe statements given in advance of incapacitating illness regarding how individuals want medical decisions made for them if they become too ill to speak for themselves.

Advance directives come in two basic forms. *Proxy advance directives* (e.g., a durable power of attorney for health care) designate a surrogate decision maker (usually a spouse or other close family member) to make decisions for the patient when he or she is no longer able. Proxy directives convey the legal right to make treatment decisions for an incapacitated individual, but do not necessarily contain any explicit guidance regarding what those decisions should be. *Instructional advance directives*, often referred to as *living wills,* include instructions of some kind about the type of care the individual would like to receive.

The concept of advance directives emerged as modern medical technology made it increasingly possible to prolong the lives of seriously ill individuals. In 1969, attorney Luis Kutner suggested that individuals too ill to make decisions for themselves could maintain their ability to influence the use of life-sustaining medical treatments such as cardiopulmonary resuscitation and artificial nutrition and hydration by documenting treatment wishes before incapacitation in what he termed a "living will." The crucial legal decision supporting the use of advance directives was a 1990 U.S. Supreme Court case involving a 24-year-old woman named Nancy Cruzan. Ms. Cruzan's parents sought legal action to remove her from life support after a car accident left her in a persistent vegetative state with no hope for recovery. The U.S. Supreme Court upheld a decision made by the Missouri Supreme Court stating that Cruzan's parents had the right to terminate treatment for their daughter only if there was "clear and convincing evidence" that this was consistent with Nancy's prior wishes. An advance directive would meet this legal standard of clear and convincing evidence.

Unlike the more controversial issue of physician-assisted suicide, the use of advance directives to refuse unwanted medical treatment near the end of life is endorsed widely by medical associations and supported by U.S. state and federal law. Advance directives have achieved similar levels of acceptance in a number of European countries, although the issue has

understandably received little attention in developing countries where medical technology is less available and in many Asian countries where cultural values are less supportive of individual autonomy as an ethical priority in medical decision making.

Although individuals can create their own advance directives without using a previously prepared form, most U.S. states have standard forms (conforming to specific state statutes), as do many organizations interested in the rights of the dying. Some advance directive forms are very specific, recording an individual's preferences for receiving specific medical treatments in specific medical scenarios. Others are quite general, focusing on documenting general values (e.g., religious) or goals (e.g., maximizing quality rather than quantity of life) that individuals wish to guide their end-of-life care. Verbal statements can also serve as legal advance directives, particularly if the statement is formally recorded by a health care professional (e.g., a do-not-resuscitate, or DNR, order noted on a patient's hospital chart).

Despite the proliferation of policy and law encouraging the use of advance directives, psychological research has raised significant questions about their ability to improve end-of-life care. Issues in particular need of future research are the stability of preferences for life-sustaining treatment across changes in an individual's psychological and medical condition, the effectiveness of advance directives in improving the accuracy of surrogate decision making, and cultural, ethnic, and racial differences in the use of advance directives and attitudes toward end-of-life care.

—Peter H. Ditto

See also Death

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AFRICAN AMERICANS

Historically, African Americans have been studied and explained as compared with the values and characteristics of Europeans. The term *African American* is an Afrocentric word adopted as a label for people who live in the United States and are descendants of slaves and who share the legacy of bondage, segregation, and legal discrimination. Their ancestors came from sub-Saharan Africa. The Afrocentric view holds that African Americans (people of African descent, African people) and their interests must be viewed as actors and agents in human history, rather than as marginal to the European historical experience.

The second Africans in North America (1528) came as indentured servants or as part of a ship's crew; the second wave of immigrants were captured in Africa and sold into bondage for the slave trade in the United States. Some of these individuals lived as free men and women, and others earned their freedom. By 1600, most African Americans were forced to come to this country as slaves on ships and under the most extreme and horrid conditions; many perished in the journey. The forced migration of people from sub-Saharan Africa occurred as a result of the growth of the tobacco and cotton industries and a need for a free and renewable labor force. Africa became a major source of the labor force that made the United States prosperous. Slavery remained legal for 200 years. About 500,000 Africans were forced into slavery in the United States; legalized slave trading was abolished in 1808.

Before the 19th century, other terms were commonly used to refer to African Americans, including words such as "colored," "Negro," and "black." The term "colored" was used during the 1800s as a means of including individuals who were the product of miscegenation (children who were born of parents who were either of European/white, American/Native American or a combination of both, and African/black). Other terms were used simultaneously during the 1890 census (e.g., black, mulatto, quadroon and octoroon, depending upon the degree of white blood in their ancestry).

The political correctness of what to call African descendants changed again during the 20th century. As a result of the Civil Rights movement of the 1970s, African Americans demanded that they be referred to as "Negro" versus "colored." During the 1970s, the Black Power movement brought about the term "black" as the appropriate reference term, followed by the term African American in the 1990s. Forms used during the 2000 Census allowed citizens to self-identify as African American/black, making the terms interchangeable. By 2003, almost half of blacks preferred to be called African American.

The label African American remains a controversial and ambiguous term for several reasons. First, not all people of African descent were descendants of slaves born in the United States. Changes in the federal immigration law in the 1960s resulted in an influx of people from sub-Saharan Africa and Latin America. These people were descendants of Africans but were not born in the United States and did not share the legacy of slavery. Their presence caused a major demographic shift in the African American population. During the 1990s, the numbers of immigrants to the United States from Africa nearly tripled; the number from the Caribbean grew by more than 60%. The number of foreign-born people of African descent was estimated to be 2.0 million in 1999, and this number represents 8% of the foreign-born population in the United States. Additionally, individuals of African descent who continue to reside in their native countries (Caribbean, Haiti, Dominican Republic, Puerto Rico, South America, and Canada) are also African Americans because of their ancestors and the fact that they reside in the Americas; none of these individuals considers himself or herself as African American, nor do governmental officials. For instance, individuals of mixed ethnicities of African and Hispanic descent are labeled on census forms as Hispanic. Others are separated as being black of Hispanic origin. Another example is people from Haiti who consider themselves Haitian, not African Americans. These individuals are classified as African American/black, resulting in a 14% (more than 4.4 million) increase in the population of African Americans, whereas the total U.S. population grew by only 10%.

Second, not all people of sub-Saharan African descent are "black." One interesting issue came to light during the 2004 presidential campaign. Historically, individuals who come from the continent of Africa are automatically thought to be black. However, a number of individuals of Euro-Caucasian and Asian-Indian descent had children who were born African. When these individuals grow up and immigrate to America, they too are technically African Americans. The same label also applies to black Africans who immigrate to the United States.

Third, the commonly identified ways of recognizing African Americans involve skin color, hair texture, and facial features. Not all African Americans have dark skin, kinky hair, broad noses, or thick lips. These characteristics often exist in other racial groups and ethnicities. There are many examples of people who self-identify as African Americans who fit the stereotypical physical features of Europeans (pale or light skin, straight hair, long thin noses, and thin lips). Historically, in the United States, any descendant of a slave, regardless of physical features, was called colored or Negro. To maintain the slave status of African descendants, any person who had a mother who was a slave was identified as a slave. Not only does the one-drop rule apply to no other group than American blacks, but apparently the rule is unique in that it is found only in the United States and not in any other nation in the world. In fact, definitions of who is black vary quite sharply from country to country, and for this reason, people in other countries often express consternation about the American definition. The one-drop rule was done to ensure the steady supply of slave labor: 4 million slave laborers for the tobacco, cotton, and agricultural industries.

ORIGINS OF AFRICAN AMERICANS

Most African Americans came to the United States in bondage. Although slavery is an institution as old as civilization (it has existed in some form among peoples of all ethnic groups), the industry changed radically with the introduction of Europeans into Africa in the 15th century. The first Africans captured and sold into bondage were exported to Central and South America to work in Portuguese and Spanish Colonies and on the sugar plantations of the Caribbean islands. As cotton, tobacco, and other agricultural needs in the colonies of North America increased, so did the demand for a cheap labor source; this demand was met with the importation of Africans. Unfortunately, the inhuman conditions of their transport resulted in 30% to 50% of Africans dying before they reached their destination.

The first documented African to come to this country was Estebanico (also known as *Estevan,* or Stephen). He arrived as a part of an expedition of 400 people from Cuba. Estevan was a slave who came to this country in February of 1528 in search of the Rio Grande River. He was killed as a part of that venture in May of 1539. The second group of Africans to arrive in North America came 100 years before the Mayflower, before what is commonly reported to be the arrival of Africans in the American colonies (Jamestown, 1619). Twenty Africans worked as indentured servants. Like other indentured servants, their servitude expired after a certain period, at which time they were freed and given a small sum of money and land to start a new life. Other Africans were also brought by Europeans: English, Dutch, French, and Spanish settlers in 1626 to New Amsterdam (later New York), and in 1636 to Salem.

As the demand for a cheap labor source grew, plantation owners found that European indentured servants and indigenous Indians were becoming scarce, and many died under the harsh working conditions. The Indian slaves, because of their knowledge of the land, were able to run away and avoid recapture. Africans represented a renewable or replaceable resource when they died and did not run away as easily because they were in a foreign land. Additionally, their physical features made them easy to identify and recapture.

Another factor that perpetuated the slave conditions of the Africans in America was the passage of laws and the acceptance of the view that they were not human beings and therefore could be treated as beasts of the field. Before 1667, most colonists believed that if a person became a Christian, he or she could not be held in slavery. The laws held that no Christians could be a slave for life; therefore, those Africans who became Christians could work their way out of slavery as indentured servants. However, in 1640, the standards for Africans were legally changed to state that only white Christians could not be enslaved for life.

In 1641, Massachusetts adopted a regulation making slavery an institution. Other colonies followed suit. That regulation held that all children born in the colonies should be defined by the race of the mother—making race an inherited condition. Religious and political philosophies were also adopted that made slavery morally correct. Slaves were defined as outsiders and were dehumanized, thus making their enslavement acceptable to the "good" Christians of the colonies. The substandard conditions of slaves were further legalized in the Declaration of Independence. The document that treasured the right to freedom of Europeans gave them the right to own slaves and pass that ownership down to their progeny; slaves could be defined as property. Slave were property that could lawfully be bred, sold, housed in conditions less than those of European settlers, maimed, and even killed. American forefathers further perpetuated these conditions in the Constitution by not outlawing slavery and by counting slaves in the Census as three fifths of a man.

In 1807, the importation of slaves from Africa and slave trade were abolished. Unfortunately, this action only created a need for slave owners to find ways of maintaining a cheap and renewable labor force to continue their prosperity. One effective method of controlling slaves was to separate them from fellow tribesmen and their families, to prohibit them from speaking their native languages, and to strip them of any identity they may have held onto from their country of origin. Traces of these attitudes toward African Americans continue to exist in contemporary American society. The legal condition of slavery ended with the end of the Civil War and the Emancipation Proclamation.

EQUALITY AND FREEDOM FOR AFRICAN AMERICANS

In 1954, the Supreme Court of the United States passed a momentous decision when it ruled in *Brown v. the Board of Education of Topeka, Kansas*, and overturned the legalization of segregation "separate but equal" (1896, *Plessy v. Ferguson*), which set the stage for the 1964 Civil Rights Act. This act led to further legislated desegregation and to specifically and inclusively define all of the areas in which society must desegregate itself. This led to the passage of the Voting Rights Act of 1965, which mandated that African Americans be allowed to vote. The 1990 Civil Rights Bill outlawed discrimination in the workplace. However, economic oppression among African Americans persists.

DEMOGRAPHIC CHARACTERISTICS

Population

Census data for 2000 showed that non-Hispanic Euro-Americans made up 69% of the U.S. population;

Table 1 Selected Sample Population of African Americans

Year of Census	*African Americans/Total U.S. Population*	*Percentage*
1860	4,441,790/31,443,790	14.1
1870	4,880,009/39,818,449	12.7
1880	6,580,793/50,155,783	13.1
1890	7,488,676/62,947,714	11.9
1900	8,833,994/75,994,575	11.6
1910	9,827,763/93,402,151	10.7
1920	10,463,131/105,710,620	9.9
1999	34,658,190/281,421,906	12.3
2003	38,749,034/290,809,777	13.3

African Americans accounted for 12%; Hispanic Americans represented 13% (Hispanic, any race); Asian and Pacific Islanders accounted for 4%; and American Indian/Eskimo/Aleut made up 1%. The proportion of African Americans in the U.S. population has remained relatively stable since 1860, about 11% to 12% (Table 1).

Geographic Location

In 1870, nearly 95% of all African Americans lived in the South, and by 1960, that number had dropped to 60%. Fifty-five percent of African Americans lived in the South in 2000. Nearly 40% of all African Americans lived in suburban areas; 18% lived in the Northeast, 18% in the Midwest, and 9% in the West. In comparison, 33% of non-Hispanic Euro-Americans lived in the South, 27% in the Midwest, 21% in the Northeast, and 19% in the West.

Like the rest of Americans, African Americans primarily live in large metropolitan areas; however, unlike non-Hispanic Euro-Americans, African Americans live in the central cities of those areas.

Age Distribution

The age distribution of African Americans in the United States is skewed toward individuals over the age of 25 (Table 2). Most African Americans are older than 18 years but younger than 64 years; the largest group within this category is between the ages of 25 and 44 years. The next largest group of individuals is between the ages of 45 and 64 years, followed by youth between the ages of 14 and 17 years.

Education

Most African Americans ages 25 and older in 2002 had obtained a high school diploma (Table 3); 17% had earned a bachelor's degree, and 17.8% had 4 years or more of college. Unfortunately, the rate of graduation in 2002 for this population had dropped by 7.8%. Additionally, rates still are lower than for non-Hispanic Euro-Americans.

Income

In 1950, African Americans averaged only 54% of the income of Euro-Americans. That average is currently at 55%. In 2002, the median annual income for African Americans was $29,177, which was 62% of Euro-American families' income. Young African American males, at all educational levels, continue to experience unemployment rates (1999) more than twice those of young Euro-American males.

Employment

In 2002, slightly more than one fourth of African Americans were employed laborers, whereas equal

Table 2 Age Distribution Data from the U.S. Census Bureau, February 25, 2002*

Age Range	*Percentage of African American Population*	*Percentage of Total Population*
<18 years	31.4	25.7
<1 year	1.5	1.4
1–4 years	1.6	5.5
5–13 years	6.5	13.2
14–17 years	16.5	5.7
18–64 years	60.4	61.9
18–24 years	11.0	9.6
25–44 years	30.9	30.2
45–64 years	18.6	22.0
65 years and older	8.1	12.4

*Columns do not add up to 100%.

Table 3 Selected Educational Statistics for African Americans, 2002

	African Americans	*Non-Hispanic Euro-Americans*
High school diploma (2002)	79% ages 25 and older 87% ages 25–29	89.0%
Completed high school (2000)	86.8%	94.0%
Bachelors degree or higher (2002)	17% ages 25 and older	29.0%
Advanced degrees (e.g., master's, PhD, MD, or JD) (2002)	1.1 million ages 25 and older	
Four or more years of college (2000)	17.8%	34.0%

numbers were employed in white collar jobs (Table 4); most individuals were employed in white collar jobs (56%). African American females continue to have more employment opportunities than African American males.

Of the 74.3 million families with money income in 2001, 8.8 million were African American, and 53.6 million were non-Hispanic Euro-Americans (Table 5).

Poverty

In 2001, 6.8 million families in the United States had incomes below the poverty level. Of these families, 1.8 million were African American and 3.1 million were non-Hispanic Euro-American. However, a greater percentage of African American families than of non-Hispanic Euro-American families were poor: 21% compared with 6%. A larger proportion of African American married-couple families (8%) than of non-Hispanic Euro-American families (3%) were poor. Families with one parent as head of household and especially those maintained by women with no spouse present have higher poverty rates overall. These rates are highest for African American heads of household. About 30.2% of all black children younger than 18 years lived in poverty in 2001.

FAMILY CHARACTERISTICS

The common view of African American families is that they are poor, are inferior to Euro-American families, represent a monolithic institution, live in urban areas, and are wrought with pathology. More contemporary Afrocentric views offer that the nuclear

Table 4 Various Employment Statistics for African Americans in 2002

Occupation	*Males*	*Females*
Operator, fabricator, and laborer	28%	9%
Technical, sales, and administrative support jobs	19%	36%
Service occupations	19%	27%
Managerial and professional specialty jobs	18%	26%

SOURCE: McKinnon, 2003.

Table 5 Family Incomes, 2001

Annual Income	*African American*	*Non-Hispanic Euro-American*
< $25,000	58% women with no spouse	41% women with no spouse
	38% men with no spouse	25% men with no spouse
≥ $50,000	52% married couples	64% married couples
	33% families	57% families
≥ $75,000	27% married couples	40% married couples
	16% families	35% families

SOURCE: McKinnon, 2003.

family is very functional rather than dysfunctional, that is, not pathological (abnormal) in terms of African heritage and kinship networks. The cultural differences that exist between African American and Euro-American families are based on the African Americans' African heritage combined with the reality of racial oppression, past and present. Previous studies of African American families did not respect African American culture, included interviews of African American fathers, and only focused on the very poorest families. Subsequent findings were then erroneously generalized to all African American families. Finally, researchers used theoretical models limited to Western cultural lifestyles.

For instance, in the European view, fathers should be head of household; therefore, the stereotypes of African American families as matriarchal led them to attribute pathology to this culture. However, recent research supports that African American families at all socioeconomic levels are equalitarian, characterized by complementarity and flexibility in family roles, in contrast to the normative pattern of white families with the more traditional patriarchal authority structure. These families are strong and tend to encourage their children to develop the skills, abilities, and behaviors necessary to survive as competent adults in a racially oppressive society. In general, black families are reported to be strong, functional, and flexible. They provide a home environment that is culturally different from that of Euro-American families in a number of ways.

The numbers of babies born to unmarried African American mothers is almost two times that of Euro-Americans, and the number of single parents and divorces is also higher for this group but is reflective of national trends.

CULTURE

The Human Genome Project made the issue of race moot. Researchers found that humans were more than 99% the same regardless of physical characteristics. The variation that is observed is not significant enough to warrant racial labels. Therefore, African

Americans simply represent ethnic group variations. Those anthropological and biological differences that result in physical trait differences between groups are frequently found in the range of variation within each group. For instance, there are African Americans who have fair skin, blue eyes, and blond hair; conversely, there are Euro-Americans who have dark skin, brown eyes, and dark, kinky hair.

African Americans represent the only Americans whose initial migration was a forced migration. They represent an incredibly wide-ranging and diverse group of people. The cultural aspects of African American life represent a combination of all ethnic groups in the Americas. What sets African Americans apart is how they have retained vestiges of their African heritage while incorporating aspects of Latin, European, Middle Eastern, Asian, and Native American cultures to create music, art, food, clothing, and linguistic styles that have influenced people from around the world. Contemporary examples include the influences of African American Rap music and Jazz on popular Euro-American culture. These influences can be seen in other countries around the world.

When Africans were forbidden to use their native languages and to communicate with people who looked like them but did not share their language, they created distinctive patterns of language. They also displayed ingenuity in incorporating the misspoken language of English when used by Italians, Irishmen, Native Americans, and others with whom they were forced to interact. The development of shortened forms of words and grammatical structures (pidgins) was another excellent example of the adaptability and intellect of the descendants of African immigrants. These adaptations can still be observed in the language of many people, including the Gullah on the Sea Islands of South Carolina and Georgia, and as a part of African American Vernacular English (AAVE), black English, or Ebonics. The usage of this type of English is often considered a legitimate form of a dialect of English spoken by some African Americans.

Although certain foods are historically said to be associated with the African American culture, a review of the conditions of poor people of all ethnic groups will show that they also used many of the same agricultural products in very similar manners, and the differences are often regional as opposed to ethnic. Foods and agricultural products commonly associated with African American culture include yams, peanuts, rice, okra, grits, indigo dyes, ham hocks, pig intestines (chitterlings), fried chicken, boiled greens, gumbo, "hoppin' John" (black-eyed peas and rice), and cotton. What does stand out is how creative Africans and their descendants became in making use of the products they found in their new land. Because they were often forced to use foods thought undesirable and discarded by their slave owners, their tenacious nature prevailed. The make-do foods were lovingly prepared and became known as *soul food.* Such foods are now recognized and labeled as cuisine.

RELIGION

African Americans come from people who embraced spiritualism; that basic belief system was transformed in the New World to Christianity for most individuals. Christianity was used as a means to help quell the unhappiness of slaves and the guilt of slave owners. Slaves were told they would receive their reward in heaven and that the protestant ethics of hard work and suffering were valued. Although Euro-Americans promoted Christianity for slaves, they kept their worship separate. This is still seen in religion today. Sunday Morning worship time has often been referred to as the most segregated time in America. Even in the time of slavery, African American churches were the seat of religious, social, and political leadership and change. The first nationwide church for African Americans was established in 1816 by Richard Allen in Philadelphia and was called the African Methodist Episcopal Church. This was followed by Baptists founding the National Baptist Convention in 1895. This is currently the largest African American religious denomination. Other religions have significant representation among African Americans. The most prominent Black Muslims organization in the United States was founded in 1935.

HOLIDAYS AND SPECIAL CELEBRATIONS

African Americans and other ethnic groups have worked tirelessly to gain legal recognition of African Americans in this country. Successful ventures include the Black History Month (first recognized as Negro History Week in 1926 and extended to become Black History Month in 1976). A national holiday was enacted in 1983 by the U.S. Congress to honor slain civil rights leader Martin Luther King, Jr., which is observed in January, the month of Dr. King's birthday. African Americans also embrace most American holidays and celebration. They also recognize such

holidays and celebrations connected to their other ethnic and religious heritages. A more recent recognition of African American culture is the 1966 advent of the festival of Kwanzaa. This celebration was designed to affirm the African heritage of African Americans and is celebrated December 26 through January 1. Each of these celebrations carries on the tradition of adaptation, flexibility, and inclusion as consistently demonstrated by the African descendants. The purpose of each celebration is to affirm the African heritage of its people and their struggles and triumphs.

CONCLUSION

The contributions of African Americans to the American culture are too numerous to cite in this article. Readers are directed to resources below to identify the scientific, cultural, religious, sports, musical, media, and other contributions of the African Americans.

—Helen D. Pratt

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AFTER-SCHOOL PROGRAMS

After-school programs (ASPs) are those programs available to children 6 to 18 years of age that are characterized by structure, adult supervision, and an emphasis on skill building. ASPs tend to be voluntary, hold regular and scheduled meetings, and emphasize developmentally based expectations and rules for the participants. In most cases, ASPs are organized around developing particular skills and achieving goals. The challenge and complexity of the program activities increase with the participants' developing abilities.

The range of ASPs available to children and adolescents in the United States is substantial. In general, ASPs can be viewed at one of three levels: (1) nationally sponsored youth organizations and federally funded programs (e.g., Boys and Girls Clubs of America, YMCA, YWCA, 21st-Century Community Learning Centers, 4-H, Boy Scouts and Girl Scouts of America, Camp Fire); (2) community, school, and local sponsorship, including grassroots youth developmental organizations, faith-based youth organizations, and public sector institutions (e.g., school-sponsored extracurricular activities, museums, libraries, youth centers, youth sports organizations, and community service programs); and (3) individual activities or types of activities (e.g., sports, music, hobby clubs, social clubs, religious and service activities), which can be differentiated on the basis of specific goals, atmosphere, and content.

Because school-age children in the United States and other Western nations spend about half of their waking hours in discretionary activities outside of school, there has been a growing interest in understanding how ASP participation may influence the development of young people. Indeed, several reports have been published that underscore the critical role of after-school time for young people (e.g., the

Packard Foundation's 1999 report, "When School Is Out"; the National Research Council's 2002 report, "Community Programs to Promote Youth Development"; the Public/Private Ventures 2002 report, "Multiple Choices After School"; the 2003 National Research Council's report, "Working Families and Growing Kids: Caring for Children and Adolescents"; the 2003 Nellie Mae Foundation report, "Critical Hours"; and the forthcoming volume, "Organized Activities as Contexts of Development"). The opportunities and risks associated with after-school time are detailed in these reports.

In the light of a rapid historical increase in maternal employment, perhaps the most basic opportunity provided by ASPs is the provision of a safe and supervised context for young people while their parents are working. However, such programs are frequently implemented with a range of additional goals indicating the increased interest in viewing after-school time as an opportunity for young people to develop competencies that complement learning experiences in the school classroom. These include (1) reducing the risks associated with unsupervised and unstructured leisure time; (2) promoting social-emotional competence, school attachment, civic engagement, and educational attainment; (3) addressing racial or ethnic and income disparity in school achievement and social adjustment; and (4) preparing young people for the transition to adulthood, higher education, and employment. In other words, ASPs allow young people to capitalize on their personal interests, abilities, and environmental resources to both reduce risks for developing problem behaviors and build competencies that increase the likelihood for healthy adjustment in the future.

The foregoing discussion implies that participation in organized after-school programs may promote positive development. But, does the available research support this assertion? The next section summarizes findings from several studies that have examined the link between ASP participation and adjustment in young people. The focus is on two types of ASPs: formal programs for school-age children, and extracurricular activities and after-school community programs for adolescents.

AFTER-SCHOOL PROGRAMS FOR SCHOOL-AGE CHILDREN

Owing in large part to increases in maternal employment, ASPs now provide child care and adult supervision for more than 8 million American children with working parents. These programs are oriented to children in the elementary and middle school years.

Several studies of after-school program participation and child adjustment have found both academic and social benefits for participating children compared with nonparticipants, or compared with children in alternative after-school arrangements such as self-care or relative care. Benefits are most apparent for disadvantaged children and for at-risk students whose parents are not native English speakers. Positive changes in school bonding, parent involvement, and school attendance appear to mediate the program-related growth in social-academic competence. However, the benefits of ASPs for children may be limited to quality programs that are regularly attended by students.

AFTER-SCHOOL PROGRAMS FOR ADOLESCENTS

Involvement in ASPs such as sports teams, lessons, and clubs is relatively common during adolescence. For example, among youth ages 12 to 17 from the 1997 National Survey of Families, 57% participated on a sports team, 29% participated in lessons, and 60% participated in clubs or organizations after school or on weekends during the last year. Recent reviews support the conclusion that participation in ASPs helps promotes several forms of competence during adolescence and beyond.

Increased Educational Attainment and Achievement

Participation in extracurricular activities and after-school community programs is associated with increased education attainment. This includes low rates of school failure and dropout, high rates of postsecondary school education, and good school achievement. Increases in school engagement and attendance, better academic performance and interpersonal competence, and higher aspirations for the future partly explain the long-term educational benefits.

Reduced Problem Behaviors

Several studies have found that participation in adolescent ASPs is associated with reduced behavior problems. This includes an associated reduction in

developing problems with alcohol and drugs, aggression, antisocial behavior and crime, or becoming a teenage parent. Activity-related affiliations with nondeviant peers, mentoring from adult activity leaders, and conventional time use are the main explanations why organized activities protect against problem behaviors.

Heightened Psychosocial Competencies

ASP participation is positively associated with psychosocial adjustment in a number of areas. For instance, participation is related to low levels of negative emotions, such as depressed mood and anxiety during adolescence, and to high levels of self-esteem. Moreover, ASP participation appears to promote initiative, which involves the application of extended effort to reach long-term goals and fosters civic identity development. The unique combination of psychological features and opportunities for positive social relationships and belonging in ASPs are salient factors thought to affect these psychosocial processes.

PROMISING AND PROBLEMATIC PRACTICES

With reference to ASPs, scholars appointed by the National Research Council and Institute of Medicine recently evaluated the features of developmental contexts that promote positive outcomes for young people. The committee derived the following list of eight key features that facilitate positive development: physical and psychological safety, appropriate structure, supportive relationships, opportunities for belonging, positive social norms, support for efficacy and mattering, opportunities for skill building, and integration of family, school, and community. The research on ASP participation indicates that programs incorporating these features do confer benefits for the participants. However, we do not yet know which features are most important or which combination of features may be optimal to promote positive adjustment for different young people.

To be sure, not all ASPs have been shown to benefit participants, and some are organized in ways that do not facilitate positive development and may be harmful. An example involves participation in youth recreation centers that provide relatively low structure, provide limited adult guidance, and lack skill-building aims. Regular involvement in these settings appears to facilitate deviant peer relationships during adolescence and leads to persistent criminal behavior into adulthood. Mentoring programs provide a second example. Volunteer mentors are often a valuable resource in providing adult guidance for adolescents and can facilitate perceived self-esteem and school achievement. However, the programs may pose a risk if the mentoring relationship is short lived or fails.

SUMMARY

ASPs are important contexts that help young people build competencies and successfully negotiate important developmental tasks of childhood and adolescence. Participation tends to be associated with academic success, mental health, positive social relationships and behaviors, identity development, and civic engagement. These benefits, in turn, pave the way for long-term educational success and help prepare young people for the transition to adulthood. Although the research findings are generally positive, variations across the types of programs and the participants suggest the need for researchers to differentiate the features of programs that facilitate development and the conditions under which the benefits is most likely to occur. Accordingly, current and future research must continue to examine what types of programs best serve the needs of different young people in the short and long terms.

—Joseph L. Mahoney

See also School

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AGE DISCRIMINATION

Robert Butler is credited with originating the term *ageism* in 1968. Ageism involves negative attitudes and discriminatory practices against individuals based on age. Such attitudes and practices often result in age discrimination, specifically against older individuals. Ageism has been evidenced in our media's excessive emphasis on youth, in our medical and mental health fields, and in employment settings.

Ageism and age discrimination are based on negative attitudes fueled by stereotypes about older people. These stereotypes contain the following incorrect assumptions: that all aging people are ailing physically and are frail and disabled; that older individuals are impaired cognitively and lack mental acuity; and that older people are perpetually depressed, gloomy, or hostile. These stereotypes involving the physical, cognitive, and emotional functioning of older people converge to produce common assumptions that older individuals lack vitality, productivity, sexuality, and the ability to learn new things—all of which contribute to age discrimination toward older individuals.

CROSS-CULTURAL VIEWS OF AGING

Ageism does not exist across all cultures. Unlike many Western nations, countries such as Japan, China, and Korea associate age with positive rather than negative features. Generally, these countries see the elderly as wise, respected, strong authority figures who advise the family. A long-standing, traditional Japanese ritual, the Kankrei, releases the elderly person from middle age responsibilities, so that he or she can have the freedom to achieve whatever he or she wishes. A national holiday in Japan, known as *Respect the Aged Day,* celebrates older people. In comparison, within the United States and other Western nations, the elderly are not considered a vital and integral part of the culture. Attitudes toward the older generation are much more negative, including the perspective that older individuals are far less productive and do not have much to offer society. Such attitudes contribute to age discrimination.

AGE DISCRIMINATION IN THE WORKPLACE

Two trends are shifting the composition of the U.S. workforce to an older one. First, there are growing numbers of people 55 years and older remaining in the workforce. In 2000, 13% of the workforce was older than 55 years, and by 2020, this number is projected to increase to 39%. In 2005, the actual number of workers 55 years or older is 22 million. Why do people continue to work longer? The reasons are varied and include increased life expectancy with good health combined with fewer physically demanding jobs, the need to financially support dependents, and increased medical and health care costs with less coverage by health care benefits and pensions. Retirement of the "baby boomers" is the second trend affecting the workforce. As the baby boomer population continues to retire throughout this decade, there will be increasingly more jobs available than workers to fill them. The result of these trends is a substantial increase and reliance on older workers.

Perhaps the most well-documented environment in which older individuals encounter age discrimination is the workplace. The older worker may face age discrimination in seeking employment and may also face discrimination on the job. Despite evidence that older employees are generally as flexible, easy to train, and cost-effective as younger workers, older job candidates may be less successful in finding employment than younger individuals. Several important factors, including contextual and situational variables, have been shown to influence age discrimination in the selection of employees. The more obvious variable that can result in age discrimination is the strength of the bias against older workers held by the individuals making the hiring decisions. Strength of such bias varies widely across people. For this reason, organizations such as the American Association of Retired Persons (AARP) and

industrial gerontologists have recommended training those who do the hiring in recognizing and counteracting potential bias against older people. A second variable, age-typing of the job involved, also is related to age discrimination. Older individuals are more at risk for being passed over in hiring processes if the job is perceived as a "younger person's job." Positive age stereotypes in relation to older workers can also exist. In such cases, older workers have the advantage because they are seen as more appropriate or qualified for an "older-person's job." Finally, empirical support exists for the idea that negative stereotypes are far more likely to inadvertently creep into hiring decisions if such decisions are conducted hastily or while the evaluator is cognitively distracted by other tasks. For this reason, employers are encouraged to avoid making decisions quickly or while they are mentally preoccupied with other work issues. Instead, such individuals need to be trained to make thoughtful and informed decisions in which they carefully evaluate all available information about the specific job candidate, while keeping aware of the potential for bias.

Older workers may also encounter age discrimination on the job in the form of poorer job performance appraisals. Age has not been found to be a good predictor of productivity, and existing research in general does not support the idea that job performance declines with age. To prevent age discrimination in job performance appraisals by supervisors, organizations are encouraged to have well-designed performance appraisal systems that are reasonable, relevant to the job, and applied consistently by different evaluators across employees and over time.

Because of concern about age discrimination in the workplace, an amendment was passed to the Fair Labor Standards in 1967. This act, known as the *Age Discrimination in Employment Act (ADEA),* was placed under the jurisdiction of the Equal Employment Opportunity Commission, a federal agency. Under ADEA, it is illegal to discriminate against older workers by basing any employment-related decision on age, age-related stereotypes, or assumptions about an individual's abilities and performance. Instead, employers must make decisions based on the specific capabilities of the individual rather than on age. The spirit of ADEA is to promote fair and equitable hiring, compensation, and treatment of older people in the workplace. ADEA and subsequent related rulings (1978, 1986) place individuals who are 40 years of age and older into a protected class and specifically prohibit discrimination against these individuals on the basis of age unless age is a "bona fide occupational qualification." *Western Air Lines v. Criswell, 1985*, established that in order for age to be considered a bona fide occupational qualification (BFOQ), the employer must be able to demonstrate that a particular age is "reasonably necessary to the normal operations of the particular business . . . all or nearly all employees above an age lack the qualifications for it." BFOQs are rare and include occupations such as airline pilot. A primary function of ADEA is the prohibiting of financially strained companies from specifically targeting and laying off their older employees. The EEOC has ruled, however, that employees can waive their rights to sue under this law in exchange for improved retirement benefits packages. Under the Older Workers Benefit Protection Act (1990), a worker has 45 days to decide whether to agree to such a waiver and then an additional 7 days after signing a waiver to revoke the decision. Such packages have been referred to colloquially as "the golden handshake," and their use is on the rise. Since the passage of ADEA, there has also been a solid trend in increasing numbers of age discrimination cases filed with the EEOC annually, with almost 20,000 age-based cases filed in 2003.

AGE DISCRIMINATION IN HEALTH AND MEDICAL PROFESSIONS

Age discrimination is not limited to the workplace; it has been found in the health and medical services provided to older individuals as well. Research suggests that medical and mental health professionals are more likely to rate older patients as less appropriate for services, treat them less aggressively, and provide them with a less positive prognosis. To date, less empirical research has been conducted in relation to ageism in environments other than employment settings, and this is an area in need of further study. However, it is theorized that *healthism,* or the inclination by medical and mental health professionals to feel more negatively about their patients with chronic health problems compared with physically and mentally healthy patients, is a stronger influence than pure age on such practices in the health arena.

IMPACT OF AGE DISCRIMINATION

On a psychological level, age discrimination can affect the self-esteem, life satisfaction, and

psychological well-being of members who experience or perceive it the strongest, and therefore can directly influence the well-being of older adults. In the workplace, age discrimination prevents qualified workers from being hired and, once the older worker is hired, can result in obstacles to advancement and premature ending of employment in the position. On a medical level, ageism can result in less compassionate and less aggressive treatment in both inpatient and outpatient situations. However, it should also be noted that contrary to ageist stereotypes, older individuals as a group are, in general, as emotionally healthy as other age groups; however, being the target of ageism is a risk factor for them. Social support from same-aged peers can serve as a protective factor against ageism because it may promote positive identity despite the social stigma of aging. The United States and other Western nations could learn much from those countries in which the older person is respected and valued and is perceived as an important and contributing member of society.

—Karen E. Mottarella and Nicole Wright

See also Ageism

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AGEISM

Robert N. Butler first introduced the term *ageism* to refer to prejudice and discrimination against older people based on the belief that aging makes people less attractive, intelligent, sexual, and productive. Ageism comprises three distinguishable yet interconnected aspects: (1) prejudicial attitudes toward older adults, old age, and the aging process; (2) discriminatory practices that focus on behaviors against older people; and (3) institutional practices and policies that perpetuate stereotypes about older adults, reduce their opportunity for life satisfaction, and undermine their personal dignity.

With medical improvement and scientific advances, the population is aging at an unprecedented rate. The proportion of U.S. residents older than 65 years rose from 9.2% in 1960 to 12.6% in 1990 and is predicted to reach 17.7% in 2020. Most developed countries in Western society show similar trends. The population structure change leads to concern about the resources necessary to support elders. This concern has resulted in continual debate among legislators and in the media on aging-related issues, such as federal debt, social security, health care, and housing. The theme of such debate focuses on whether there are ageism practices in the corresponding area and how to protect elders from age-related discrimination. Overall, a trend has been expected that older individuals would wield considerably more political power, be more active in the workplace and education, and have a much greater stake in the world's economic output.

There are legislative acts providing broad protections against ageism, such as the 1967 Age Discrimination in Employment Act (ADEA) and the amended Older Workers' Benefit Protection Act. The former was designed to protect employees older than 40 years from differential treatment in all phases of the employment process. The latter act was designed to ensure that early retirement packages and other incentives that require workers to waive their right to sue for age discrimination are offered in a way that does not unduly harm the worker. However, a recent Supreme Court ruling implies that elders do not deserve special protections against ageism because they do not constitute a group with a history of discrimination. Consistent with this, mandatory retirement and increasing insurance costs on the basis of age alone, rather than competence or demonstrated health risks, are still legal.

Although the ADEA legislation has allowed many older workers to continue employment, there are still other manifestations of ageism in the workplace. First, hiring and firing practices are age differentiated. Qualified older workers are less likely to be hired for positions than same qualified young workers. When forced to downsize, organizations are likely to target early retirement and layoffs at older workers. These observed patterns of employment that favor young workers over older workers may be due to the stereotypical beliefs about physical and mental declines of older individuals. Second, organizations are often reluctant to train older workers. Accumulated evidence suggests that strongly held societal beliefs are responsible, such as older people are unwilling to change, not worth training because they will not be around long, learn too slowly, do poorly in the classroom, and are computer illiterate. Third, declining earnings by older workers have been related to ageism. Stereotypes about older workers as being unable to perform and produce at levels that are required by the workplace are common. They lead to age differences in wages, after controlling for worker background, education, training, experience, job characteristics, and labor market conditions.

In summary, ageism is a form of discrimination based on age alone. Because of the changing demographics in Western society, it becomes increasingly important to protect the elderly from ageism in all aspects of their lives.

—Yiwei Chen and Mo Wang

See also Age Discrimination

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AGGRESSION

Aggressive behavior often poses problems in humans across the life span, both as initiators and recipients of aggression. The study of the causes of and methods to reduce aggression is vital, especially with regard to the psychological development of children and adolescents.

DEFINITIONS

Aggression is a verbal or physical behavior that involves delivery of a noxious stimulus (e.g., an insult, a punch) to another person with the *intent to harm* that person. Aggression is not assertiveness, such as standing up for oneself, and it is not accidental. Violence is extreme aggression that usually results in severe injury to the recipient. There are four main types of aggression: (1) *impulsive,* which occurs without thought and usually when the person is uncomfortable (e.g., feels hot); (2) *retaliatory,* which occurs in response to provocation (such as a slap from another person); (3) *instrumental,* which is when a person aggresses to attain another goal, such as hitting in order to get a desired toy; and (4) *angry,* which is when the person experiences anger while aggressing.

CAUSES OF AGGRESSION

Situational Factors

Four of the most heavily studied situational causes of aggression are when a person (1) is verbally or physically attacked, (2) perceives that he or she is being blocked from obtaining a goal and feels frustrated, (3) feels physically uncomfortable or in pain, and (4) is exposed to violent media. Insults and physical attacks from others are, of course, a main cause of retaliatory aggression. Research has clearly shown that situations that evoke frustration, such as when a person cannot solve a jigsaw puzzle or when the car in front of a person fails to move after the traffic light turns green, often result in increased aggression. Frustration effects on aggression are exacerbated when coupled with a provocation (e.g., an insult).

Similarly, uncomfortable environments, such as those that are hot, painful, or noisy or that cause sleep deprivation, also often result in enhanced irritability and aggression. For example, many archival studies of

the relation between heat and violent crime (i.e., murder, rape, assault) have found that hot days, months, years, and locations are associated with higher violent crime rates than are comfortably cool days, months, years, and locations. Aggression is less likely to occur in uncomfortable situations if the individual thinks that he or she can control the cause of the discomfort. For example, when participants are given opportunities to turn off a loud noise, they act less aggressively than participants exposed to noise that they cannot turn off. Often, the aggression that results when a person is uncomfortable is impulsive; the person "lashes out" at another person without provocation.

Watching violent television and movies, playing violent video games, and listening to music with violent lyrics have all been shown to increase aggressive thoughts and feelings and sometimes result in aggressive behavior. Early research on media violence revealed significant positive correlations between watching violent television and aggressive behavior, but these findings were criticized because the correlational nature of the data did not allow for conclusions to be drawn about the causal role of violent television. That is, these studies found that people (mostly school-age children) who watched a lot of violent television were reported as acting more aggressively by peers, parents, teachers, and even the children themselves, than those who watched less or no violent television programs. However, the higher aggression in those who watched violent television could be explained by many other causes, such as that people with aggressive personalities tend to aggress more (and also tend to watch violent television).

Media violence research over the past three decades has been more methodologically sophisticated and has included experimental designs that control for all other potential causes of aggression and test exclusively the effects of viewing media violence. The conclusion from these studies is clear: exposure to violent media (e.g., television shows, movies, music lyrics, video games) increases aggressive thoughts and angry feelings and may increase aggressive behavior. Young children are especially susceptible to these effects because they are highly likely to imitate aggressive (especially same-sex) models and because they cannot easily discern fantasy from reality. Imitation effects of violent video games are particularly problematic because of the active physical and psychological engagement with the games as well as personal identification with the characters. New research has found that even video games rated "for everyone" (as well as those labeled "for mature audiences only") have been associated with increased aggressive behavior.

Person Factors

Many researchers who have studied and theorized about aggression are social psychologists who focus on the roles of situational factors and underestimate the effects of factors about the person such as aggressive personalities and biological and genetic predispositions. Therefore, early theories of aggression mostly assumed that aggressive behavior is not consistently expressed across the life span; rather, it is evoked by some external stimulus.

The assumption that aggressiveness is not a stable disposition across the life span changed when Olweus published a review of several longitudinal studies that measured aggressive behavior of children of different ages across time. Several studies found that 3-year-old children differ in aggressiveness and that the intensity and frequency of their aggressive acts at age 3 were similar to the intensity and frequency of aggression 12 to 18 months later. Aggressive children between the ages of 8 and 9 aggressed at similar rates 10 to 14 years later. Olweus also found that 12- and 13-year-olds aggressed at a similar rate and in similar ways for 1 to 5 years. These findings, however, should not be interpreted as meaning that certain people are aggressive most of the time. Alternatively, Olweus suggested that aggressive dispositions (or personalities) interact with both situational factors and the person's interpretation of the situation to predict (and produce) aggressive behavior.

Boys and girls have been found to differ in the type of aggression that they display, and these sex differences are attenuated by age. Several studies have found that boys tend to engage in more "direct" physical or verbal aggression against a target. Girls have been found to engage in more "indirect" aggression, which involves manipulations of social networks to isolate or otherwise psychologically harm the target. Sex differences in indirect aggression have been found in 8 year olds and more so in 11 year olds, when social skills are more developed. Sex differences in adult aggression are less pronounced, but the same pattern of the direct and indirect types of aggression have been demonstrated. Studies on the intensity of displayed aggression have revealed that males tend to act more

aggressively than females when they are not provoked by another person, but when provoked, women are as aggressive as men. Women are also as aggressive as men when the aggression is displayed in written or verbal forms (rather than in physical behavior).

Testosterone levels have also been shown to positively relate to expression of aggressive behavior in both men and women. Decreases in estrogen and progesterone, which occur in the premenstrual phase of the menstrual cycle, are similarly associated with an increase in aggressive behavior. Some genetic factors have been found to relate to aggression, such as the high proportion of males incarcerated in prison for committing violent crimes who have an additional Y chromosome (i.e., they have an XYY genetic chromosomal makeup).

The way that people cognitively interpret potentially provoking situations has further been shown to predict aggression. Child and adolescent bullies tend to be less capable than nonbullies at correctly understanding other people's intentions in social situations. Bullies often assume that others are threatening them when they are not and respond "in kind" by aggressing. This tendency has been labeled a *hostile attribution bias* because such individuals tend to falsely attribute hostile intent to other people's actions.

Men and women have also been found to differ in their interpretations of their own aggressive behaviors. Men tend to view aggression as an effective way to control other people in order to attain interpersonal or other goals and often report the aggression as satisfying. Alternatively, women tend to view their own aggression as uncontrolled emotional behavior and feel guilty and remorseful for their inability to suppress the emotional outburst.

Summary

Main situational causes of aggression are verbal and physical provocation, frustration, physical discomfort, and violent media exposure. Person causal factors include an aggressive personality, which is often consistent across the life span, and genetic and biological factors such as testosterone levels and presence of an extra Y chromosome. Males tend to engage in direct aggression and females in indirect (or manipulative) aggression, and when women are provoked, they may be as aggressive as men. Finally, cognitive interpretations of potential threats affect whether or not individuals respond aggressively.

THEORIES OF AGGRESSION

Frustration-Aggression Theory

One of the earliest theories of aggression is the frustration-aggression theory, which states that frustration always causes aggression and that aggression is always caused by frustration. Research has since clarified that this theory is too restrictive; although frustration is a main cause of aggression, it does not *always* precipitate aggression, and frustration is not necessary for the expression of aggression.

Social Learning Theory

Social learning theory, a meta-theory of psychology that provides an elegant explanation of learning processes, was first applied to describe why children repeat the aggressive behavior that they witness. Children often imitate aggressive behavior that has been *modeled* by another person (particularly if that model is of the same sex as the child and if the model is rewarded for aggressing, called *vicarious reinforcement*). Children are less likely to engage in aggression when they observe a model receive negative consequences for aggressing (*vicarious punishment*).

Cognitive-Neoassociationism Theory

The cognitive-neoassociation theory posits that thoughts, feelings, and behavioral tendencies are stored together in memory networks analogous to spider webs. Exposure to an aggressive stimulus (such as a picture of a weapon or a provocation) can automatically bring to mind hostile thoughts and angry feelings and can increase the likelihood of an aggressive response.

Excitation Transfer Theory of Arousal

According to the excitation transfer theory of arousal, people are more likely to act aggressively when they are physiologically aroused, especially when an aggressive stimulus is present (e.g., during or after exercise, or following ingestion of a drug that enhances central nervous system activity). For example, if a person is insulted after exercising, then their physiological arousal can be "misattributed" to anger toward the insulter rather than to the exercise, and the person may feel more intense anger and aggression propensity than would a nonaroused individual.

General Aggression Model

The general aggression model (GAM) is one of the most comprehensive theories of aggression in that it consolidates the components of each of the previously described theories with the effects of person variables that have been correlated with aggressive behavior. The GAM posits that both situational (e.g., frustrating events or viewing of weapons) and person (e.g., attitudes endorsing violence) factors can independently or jointly cause an increase in aggressive thoughts, feelings, and physiological arousal. According to the GAM, when aggressive thoughts, feelings, or arousal are enhanced, the person then either engages in a rapid, immediate appraisal of the situation (e.g., "she shoved me, and I am going to shove her back") or in a more deliberate, thoughtful appraisal of the situation, in which they think about potential causes of the aggressive stimulus (e.g., "perhaps she shoved me by accident") and about the potential costs or rewards associated with aggressing.

If the person does not have the time or motivation to think about the causes of the aggressive stimulus or the potential negative consequences of aggression, then the person is likely to engage in impulsive aggression, often very quickly. If the person does think about the causes and possible consequences of their actions, then they are more likely to engage in thoughtful deliberative behavior that may or may not be aggressive. The "target" person in the social interaction who "receives" the aggressive or nonaggressive response then will respond in some way, which influences the other person's beliefs and may serve as yet another situational stimulus (e.g., a provocation) that can again initiate the cycle described.

Summary

Five theories of aggression are presented: frustration-aggression, social learning, cognitive-neoassociationism, excitation transfer theory of arousal, and the GAM. The first four theories focus on different causal mechanisms, namely frustration, imitation, priming of aggressive thoughts, and misattributing physiological arousal to a feeling of anger. The GAM incorporates the tenets of each of these theories and provides a comprehensive framework for understanding how situational and person factors affect aggressive thoughts and feelings that result in impulsive or deliberative aggression (or refraining from aggression).

AGGRESSION AND CHILD-REARING PRACTICES

Early life experiences and the environment in which children are raised can influence and inhibit aggressive responses. Studies of child-rearing practices have shown that positive parent-child relationships, reasonable discipline, appropriate supervision, open communication, and modeling prosocial family values and behaviors all contribute to protecting children from acquiring aggressive and problematic behaviors.

Parent-Child Relationships

Researchers of early childhood development generally agree that the responsiveness of caretakers and their relationships with children in their care are important predictors of children's social competence, coping skills, and ability to form close friendships and intimate, nonaggressive relationships. Securely attached children have protective factors that act as social and emotional buffers against many risk factors correlated with aggression. Preschoolers and young children from stable and emotionally supportive caregivers possess higher levels of self-esteem, demonstrate higher levels of appropriate self-reliance and reality testing, respond more empathetically to others, and are more socially adept and accepted by others. Additionally, social scientists have shown that adolescents and young adults from nurturing parental figures form caring and healthy friendships with both sexes and experience intimate relationships in which both positive and negative affective states are explored and expressed nonaggressively.

Conversely, preschoolers and young children with hostile or rejecting parental figures tend to respond aggressively and with anger to younger siblings and peers, and later in life relationships. Children who experienced unpredictable and insensitive parents were shown to become anxiously needy and angry, characteristics highly correlated with aggressive behavior, such as jealousy, competitiveness, and possessiveness.

Child-rearing practices in which parental figures are both abusive and neglectful create a high probability that these children will view the world as dangerous, rejecting, unpredictable, and unavailable to meet their needs. Feelings of anger and fear have also been shown to predict aggressive dysfunctional

coping strategies in children (i.e., controlling through bullying, threatening, and other forms of aggression). Additionally, mental health problems such as depression, anxiety, and conduct disorders have been positively correlated with abusive and neglectful parenting practices.

Discipline

Child rearing also involves setting boundaries, providing adequate supervision, and disciplining children. Parental characteristics such as age, socioeconomic conditions, marital status, and larger family size relate to parental discipline styles. To establish desirable nonaggressive behavior, researchers have demonstrated the importance of reinforcing targeted nonaggressive behaviors. Some forms of punishment can engender feelings of anger and shame and arouse a desire for revenge, highly connected with aggression and violent behavior.

Corporal punishment has been demonstrated to have both short- and long-term negative effects on children, including the development of antisocial behaviors. An important longitudinal study found that children were more likely to engage in aggressive behaviors if subjected to severe physical discipline, particularly when other early social and emotional needs were not met. Although corporal punishment remains a parental right, the practice has largely been abandoned by educational institutions and is illegal in a little more than half of the states in the United States. Adult corporal punishment of children is legally considered a form a child abuse in several countries around the world.

Summary

Child-rearing practices that promote nonaggressive behaviors include positive parent-child relationships, modeling healthy and nonviolent responses to conflict and stress, monitoring children's behaviors, establishing boundaries and expectations for children, and communicating prosocial family and community values.

ROLE OF PEER RELATIONSHIPS AND AGGRESSION

It is long established that peer relationships of children, along with family context, are critical factors in evaluating the developmental trajectories of aggression in children. Researchers have been interested in several types of social peer interactions, specifically friendships, mutual antipathies, rejection by peers, and bullying and peer victimization.

Friendships

Friendships are based on reciprocal liking and equality. Beginning at an early age, peer relationships establish a model for future adult relationships while providing social and cognitive developmental skills. Friendships provide a multitude of benefits, including resource sharing, collaboration of ideas, mutual trust, feedback, feelings of belonging, and entertainment. It is not clear whether well-adjusted children are more likeable or if friendships contribute to helping children become socially competent. Nevertheless, friendships and social affiliation are positively associated with nonaggressive behaviors in children and are predictive of future relationships.

Friends also exhibit aggressive behaviors such as verbal or physical fights. However, this form of aggression is characteristically not as forceful; the parties reunite after fighting, and the role of aggressor alternates. Some researchers suggest the ability to make and maintain friendships is the best predictor for healthy adult adaptation.

Relationships Involving Rejection and Mutual Dislike

Children experience rejection by peers as well as relationships involving mutual dislike. Studies show both types of relationships are common. However, research in this area of peer relationships is sparse, and the outcomes from studies are mixed. Children who experience rejection when other factors place them at risk (such as violent neighborhoods and poor family relations) may turn to aggressive outlets. Further, inimical peer relationships may place children at greater risk for exhibiting aggressive behaviors because conflicts and confrontation may lead to violent expression. However, socially adept children experience rejection and have antipathies without harmful effects or signs of aggressive responses. In fact, in both male and female relationships, enemies may inhibit aggressive behavior. The findings are not conclusive, and future studies of relationships between enemies will likely examine such factors as communication patterns, relationship importance, the circumstances and dynamics surrounding animosity, and the emotional consequences of rejection and conflict in peer relationships.

Bullying and Peer Victimization

As a result of an increase in violence in primary, secondary, and high schools worldwide, peer relationships characterized by bullying and peer victimization have received international attention. Bullying, generally carried out in small groups, consists of verbal humiliation, physical assaults (including sexual assaults), and social ostracism. Researchers generally agree the primary motivator for bullying is power and a strong desire to achieve some material or social reward. Studies have found bullying behaviors (without intervention) persist into adulthood and may be a source of depression, physical illnesses, anxiety, substance abuse, and academic failure.

Peer relationships involving bullying behavior, once believed to be a male phenomenon, appear to be common to both sexes. Although males tend to use more direct forms of aggression such as hitting and biting, even against females, older children and females generally employ indirect relational aggression such as spreading rumors and encouraging others to exclude peer victims. These types of behaviors, evident during early childhood, appear stable over time. Although researchers are uncertain whether male or female tactics are more severe, most victims of bullying do score lower on measures of self-esteem and higher on emotional problems. It is anticipated that exploration of personality development, environmental factors, family relationships, attitude formation, and cognitive development in bullies and victims will contribute to programs implemented in schools to prevent these negative peer relationship patterns.

Summary

Peers exhibit aggressive behaviors in their relationships. Some aggression is normal and part of the socialization process, whereas other behaviors are injurious and developmentally harmful for children.

ANGER AND ANGER MANAGEMENT PROGRAMS

Anger

Anger is a natural human emotion with the potential for both constructive and destructive consequences. When channeled constructively, it has been credited with motivating positive life changes, asserting personal and collective rights, and even providing the impetus for creativity. Although some scholars assert anger is never a constructive emotion, almost all would agree that suppressed or explosive anger is destructive and can lead to acts of violence, physical ailments including heart disease and other stress-related illnesses, and psychological symptoms associated with anxiety, depression, and substance abuse. Additionally, suppressed anger has been associated with passive-aggressive behavior, sarcasm, cynicism, and verbal hostility. It is estimated that most people experience anger several times a week. Although most people generally express their anger verbally, about 10% respond with physical aggression.

Anger Management Programs

Programs designed to reduce the expression of anger in unhealthy and violent ways have become a lucrative industry in the United States and around the globe. Legal and educational systems, business enterprises, government agencies, and many other institutions have directed individuals into anger management classes designed to teach participants inner and interpersonal problem-solving and peacemaking skills.

Anger management programs are diverse in course content, format, number of sessions, and theoretical orientations. Although studies have substantiated the value and usefulness of the skills acquired in these workshops, anger management programs are by no means an educational or treatment panacea for every type of anger or every type of angry person. In fact, they are not reliably predictive of outcomes for participants. Ongoing research has identified several important factors currently under investigation, including gender, ethnicity, and cultural differences; environmental factors; readiness and expectations about the program itself; the setting in which the program is delivered; the personal goals of the participants; and the individual's level of personality trait anger.

Most anger management programs are based on sound psychological principles and instructed by mental health professionals. Although there is a proliferation of anger management programs worldwide, the science lags behind the industry. The American Psychological Association has credited anger management programs as helpful for some participants, whereas the American Psychiatric Association has not made such an endorsement, largely because no

diagnostic category for anger exists in the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV-TR).* Researchers are trying to establish whether there is a separate set of criteria for such a diagnosis or whether anger is in fact a constellation of many different clinical disorders. Most academic scholars do agree that anger remains one of the most understudied emotions to date.

Anger Management Curriculum

Some anger management programs teach participants to punch pillows, hit punching bags, or otherwise discharge anger in a physically aggressive manner. This practice is predicated on application of the Freudian theory of "catharsis," which posits that acting aggressively should reduce aggressive impulses by "getting it out of the person's system." Paradoxically, research studies have clearly demonstrated that these practices tend to escalate the intensity of anger and fail to decrease aggressive behavior. Acting aggressively toward inanimate objects also strongly associates angry feelings with aggressive responses (i.e., conditioning).

Today, most anger management programs provide instruction in the art of relaxation, problem-solving skills, and cognitive-behavioral strategies focused on changing thoughts and maladaptive behavioral responses. Some programs incorporate conflict resolution techniques, communication training, forgiveness, self-monitoring, and even humor. Although it is fair to say that most anger management programs are psychoeducational in nature, a minority of them are more firmly rooted in traditional therapeutic approaches such as insight-oriented exercises, personality assessments, and self-exploration and family-of-origin exploration, especially for individuals with histories of violence. It is anticipated that future programs will be able to tailor anger management programs for each participant rather than providing a generic program. Toward that end, researchers are investigating whether one-on-one training programs are more effective than group sessions.

Summary

Definitions and conceptualizations of anger have been debated in the psychological literature, whereas the need for consensus in understanding of the etiology and control of anger is great, both nationally and internationally. Effective anger management programs teach participants to identify angry feelings and divert them into nonaggressive and constructive channels of expression.

PREVENTION OF AGGRESSION

Because environmental and intrapersonal characteristics factor into the equation of aggression and violence, prevention involves a multidimensional and multidisciplinary approach that begins early in the child's life. The following types of programs contain key prevention factors that have been identified as important deterrents in developing or expressing aggression in violent ways:

1. Early childhood school programs that include *early identification* of mental health problems, learning disabilities, and behavioral, emotional, or cognitive developmental delays contribute to preventing hostile and aggressive behavior in children (found in longitudinal studies of children in day care and early childhood programs)
2. Programs to help parents develop *positive parent-child relationships*, adequate supervision, consistent and reasonable discipline, and prosocial family values
3. Programs designed to assist parents (and other significant adult influences) to become *nonaggressive role models* for children (including domestic violence prevention programs)
4. Programs designed to *deter alcohol and drug use* in parents and children (because of the strong correlation between drug and alcohol use and aggression)
5. Multicultural and gender diversity training programs that provide *cooperative work with people who differ*, particularly in terms of racial and ethnic background, gender, religion, sexual orientation, and physical abilities
6. Educational and employment-related programs designed to help individuals *establish economic stability* (and parity) because communities with economic hardship are at higher risk for violence
7. Programs designed to *reduce undesirable amounts of exposure to violent media* such as television, movies, music, and video games
8. Programs designed to reduce gun availability

CONCLUSION

Aggression is influenced by situational factors, such as frustrating events and the provocation of others; person factors, such as one's personality and gender; and the individual's cognitive interpretation of the situation. Theoretical models of both the causes and methods to prevent aggression reflect these factors. Parental and peer engagement in or abstention from aggression is often imitated by children (and adults) and influence subsequent aggression. Parenting that develops emotionally secure relationships with children fosters less development of pugnacious tendencies in children. Intervention and prevention programs that focus on reducing exposure to aggressive stimuli, such as weapons, violent video games, highly aggressive peers and drugs associated with aggression, and on helping individuals interpret stimuli nonaggressively and not experience enhanced anger, perhaps through the use of relaxation techniques, have been posited as useful in reducing aggression.

—Kathryn B. Anderson and Regina Cusack

See also Anger, Bullying

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AGING

Aging is inevitable. Although the average life expectancy has increased dramatically in recent years, we have yet to discover the proverbial fountain of youth. As such, our body gradually succumbs to the aging process. This process is so powerful that it inundates every aspect of life, from changes in appearance and limited physical mobility to cognitive impairments that may rob us of our very essence. These age-related changes are resultant of both pathological and normal aging processes. Although age-related diseases such as Alzheimer's and Parkinson's can be traced to pathological aberrations, "normal" aging surely contributes to the downward progression of these disorders as well. Despite what could be perceived as a bleak prognosis, there is striking individual variability in how aging influences our everyday life both between and within demographic groups. Consider the range in physical abilities and the disparity of cognitive abilities in an aged population. For instance, although aging generally leads to a reduction in muscle strength, the actual rate of decline can be affected by lifestyle variables such as activity level, diet, basal metabolic rate, and a host of other contributing factors. Indeed, older athletes who continue to train can maintain high levels of athletic competence. It seems unrealistic to believe that we can forever thwart the "beast" of age. Yet, through a better understanding of how the aging process interacts with biological, cognitive, and social aspects of our lives, we hope to glean insight into how we might age successfully.

NEUROANATOMICAL CORRELATES OF AGING

It comes as no surprise that our brain ages in a manner much similar to other bodily organs. These changes are evident using techniques that range from the molecular to the psychological, and everything between. Age-related changes in function are associated

with structural brain changes that can have profound psychological consequences. For example, visual impairment is one of the first symptoms of aging, with the average 85-year-old demonstrating about 80% less visual acuity than that of a 40-year-old. Fortunately, from an aging brain perspective, retinal degeneration appears to be the major cause of this change because the brain areas involved in visual processing appear to remain generally unaffected. Although this observation may not be cause for celebration, it does suggest that brain circuitry remains relatively intact with advanced age, dispelling a common misconception about how the brain ages: the idea that age-related neuron loss is ubiquitous. Technological advances have been instrumental in debunking this belief, with evidence accumulating that the brain does not atrophy in a nonspecific, passive manner akin to that of a muscle with misuse. In contrast, brain atrophy appears to be limited in extent, selective in regional expression, and subject to considerable individual variability. For example, early research suggested that widespread, senescence-associated cell loss occurred throughout the hippocampus, an area of the brain heavily implicated in the formation of many types of new memories. Consistent with this notion are the observations that the types of memories processed by the hippocampus are frequently compromised in older adults. Yet, recent studies using improved microscopic techniques indicate that hippocampal cell loss is relatively minimal and restricted to specific hippocampal subfields. These regional and discrete observations parallel those of memory decline seen in old age; not all aspects of memory function are impaired; rather, only specific modes are influenced by the aging process. In particular, hippocampal function is strongly correlated with the ability to form durable memory traces, with older adults showing greater declines in memory for newly acquired information dependent on this ability, relative to well-established, long-standing memories that are more readily retrieved by older adults. Other areas of the brain yield similar observations. Consider, for example, the cerebellum—a brain region that plays a major role in orchestrating directed movement. Impaired motor coordination and balance are common complaints in old age, which could suggest impaired cerebellar function. In part, this is true because there is significant age-associated neuron loss in the anterior lobe of this structure, yet the entire cerebellum is not equally affected.

Despite the evidence that widespread cell loss is not a recurrent theme in the aging brain, some brain regions are particularly susceptible to the deleterious effects of aging. The cerebral cortex has been the focus of a great deal of research because it is highly developed in evolutionarily advanced animals—humans included. Moreover, the cortex is organized in a highly conserved, laminar pattern that greatly facilitates identifying cell layers (and the subsequent input and output pathways) and subregions of the cortex itself. In regard to aging, one area in particular in the cortical region has been the focus of intense research scrutiny—the prefrontal cortex. The prefrontal cortex is a brain region involved in controlling an array of functions, all generally related to the ability to regulate and organize behavior. At a cellular level, dendritic arborization in superficial cortical layers of this region is diminished with advanced age, whereas deeper cortical layers are relatively unaffected. On a more global level, the prefrontal cortex appears to be particularly susceptible to the effects of age because this area experiences a greater overall volumetric loss than is experienced in other cortical regions. These structural observations also have functional correlates, with reduced prefrontal activation during performance of cognitive tasks. Behaviorally, these changes manifest as declines in the ability to engage strategic memory processing (i.e., the coordinating, interpreting, and elaborating of information that occurs during memory encoding to place it in its appropriate context and facilitate its later retrieval). It is this specific strategic use of memory that appears to show the greatest decline in old age, with the largest decrements seen in free recall, whereby strategic memory processing must be engaged in order for successful retrieval to occur.

An age-associated reduction in dendritic arborization of supragranular neurons is also seen in the parietal region of cortex, specifically in Wernicke's area in the parietal lobe (a cortical region involved in language comprehension). In fact, these effects, as well as those previously mentioned for prefrontal cortex, appear to reflect their developmental progression. Specifically, dendrites in supragranular cortical layers continue to expand well into adulthood, whereas dendrites in deep cortical layers are relatively stable much earlier in life. Consistent with these observations, the distal sectors of the dendritic arbor appear also to be more responsive to experiential effects. Ironically, this property of enduring brain plasticity in these distal

regions across the life span may ultimately predispose this region to age-related deterioration.

At the cellular level, dendritic spines (the site of most excitatory synaptic contacts between neurons), neurotransmitter levels (the chemicals used by neurons to communicate with each other), and even cellular receptors (the site at which neurotransmitters have their primary effect) have been shown to be quite responsive to differential experience. Considering these parallels between developmental and experiential plasticity, and the seeming increased susceptibility during aging, it is not surprising that there is an age-associated reduction in spine and receptor density in selective brain regions and that the physiological properties of neurons are dramatically affected by such changes.

NONNEURONAL BRAIN CHANGES

Although most attention has traditionally emphasized the role of neurons in brain function, the contributions of glia (historically viewed as support cells; involved in processes such as neuronal insulation and phagocytic activity) and dynamic changes in vasculature are becoming rapidly appreciated. Like that for neurons, there are glia-specific changes in response to behavioral experiences and both regional and cell-specific modifications. Similar to neurons, the types of glia and their functions are differentially modified in senescence. For example, age-related alterations in myelination (the insulation of nerve fibers) have been reported, an observation that parallels changes in cognitive abilities. Specifically, small-diameter fibers appear particularly vulnerable to age-related degeneration, with a loss of about 10% per decade. Conversely, astrocytic activity (typically associated with repair and restorative functions) has been reported elevated in several brain areas of aged subjects.

Much like that for neurons and glia, the cerebral vasculature has been shown to be quite responsive to altered demands. Changes in brain vasculature are reflected most obviously by the increased incidence of stroke in aged individuals. Unfortunately, by the time a stroke is overtly diagnosable, a series of smaller such episodes have already occurred. Our inability to detect these smaller strokes is limited, in large, by the spatial resolution of modern neuroimaging of the cerebrovasculature. By analogy, vascular blockage of the heart must be quite severe to be detected. As such, impaired cardiovascular health oftentimes is undiagnosed for many years. Surely, similar effects also occur in the brain. If so, the loss of a significant number of these small-diameter vessels would likely go undetected for a great period of time using current imaging techniques. We know that the cerebral vasculature, like that for neurons and glia, is responsive to differential experience—creating more vessels in response to neuronal demand. This robust plasticity of the cerebral vasculature suggests that blood flow, or the lack thereof, may play a key role in the cognitive decline frequently observed with normal aging. Congruent with this notion, it has been shown that poor cardiovascular health is linked to greater incidence of Alzheimer's disease.

Theoretical View of the Influences on Brain Aging

Taken together, the previously mentioned observations suggest that the very mechanisms that enable our brain to change in response to experiences earlier in life may be implicated for the decrements observed later in life. Yet, as previously discussed, there are striking interindividual differences in behavioral outcomes. Moreover, a great deal of variability exists in the underlying anatomy and physiology. Are some individuals prone to cognitive impairments with advanced age and others somehow relatively immune to such declines? That is, why do some individuals succumb to the deleterious cognitive effects of age early in senescence while others appear to be relatively unaffected well into advanced age? It has been suggested that a decline in synaptic density may "set the stage" for age-related changes in cognition for both normal aging and pathological conditions. The underlying anatomy is influenced by both genetic and experiential factors. Yet, to date, we have been unable to identify the source of such anatomical differences and, as such, cannot completely account for individual differences.

It is here that a theoretical approach to these processes is of particular value. One such theory is the canalization model of development proposed by C. H. Waddington (see Grossman et al., 2003). Although originally conceived to address developmental progression, this model can be readily modified to incorporate both genetic and nongenetic factors linked to age-related declines in cognition as well. In this model, envision a sloped canal with early life events depicted at the top of the canal. An individual is

represented by a "ball" that travels along the canal surface, "downward" as life progresses. The slope of the canal is defined by genetic influences and serves to guide the developmental progression of an individual in a normalizing manner, along the bottom of the canal. In the model, genetic and experiential events are encountered along the walls of the canal and can serve to promote normal development (the ball rolls toward the middle of the canal), or push development up the slope toward a threshold that defines abnormal behavior (in this case, age-related deficiencies). In regard to aging, this model incorporates a host of factors such as a progressive loss of neurons or spines, individual differences such as genetic predispositions and congenital perturbations, and environmental influences such as toxic assaults (all leading to reduced synapse numbers and altered neuronal function). Such factors would serve to push an individual toward, and possibly to surpass, an individually defined threshold of overt behavioral deficits. Likewise, the model captures the influence of canalizing experiences that serve to normalize or restore function. Indeed, evidence is accumulating that advanced education, physical exercise, continued cognitive challenges, and genetic differences all lead to maintained synapse numbers and robust, healthy neuronal function. Together, these interventions may, to some extent, "immunize" the brain to progressive pathology later in life. All told, these findings point to the conclusion that although neuronal cell loss occurs with advancing age, the brain can be protected to some extent by differential experiences, explaining why some individuals face impairments in mental function in old age, whereas others appear to be relatively impervious to such effects. Moreover, these general findings suggest that neural vitality (and by parallel—behavioral) is best maintained through a philosophy of "use it or lose it," dispelling another misconception: that eventual "wear and tear" is the underlying cause for such deficits. Increasing amounts of data from a number of longitudinal studies support these claims: education and intellectually engaging activities buffer against cognitive decline in old age.

PSYCHOSOCIAL INFLUENCES ON BRAIN–BEHAVIOR RELATIONSHIPS

Although the above discussion suggests that changes in brain structure and function, at both the neuronal and nonneuronal levels, are strongly linked to cognitive-behavioral decrements in the older adult, these decrements are neither inevitable nor irreversible. The real story is much more complicated because cognitive function in old age is characterized by growth, decline, and stability. Strategic memory processing, for example, which has been described as being particularly problematic in old age, is an important aspect of one type of memory that has been linked to reliable age differences—declarative memory. Declarative memory generally refers to the conscious experience of remembering, usually tested through recall or recognition measures, and can be thought of in terms of "knowing that." Examples of these types of memories include remembering the state capital, the name of a spouse, or the rules of a game. This type of memory can be dissociated from nondeclarative memory, usually measured indirectly by observing changes in performance that result from prior experience, without any conscious recollection or reference to that experience. Nondeclarative memory encompasses many different forms, supported by distinct neural pathways, and generally shows little, if any, appreciable decline with advancing age. This type of memory can be thought of in terms of "knowing how." Some examples of nondeclarative memory function include skill learning and repetition priming (facilitated processing of previously encountered stimuli, i.e., a change in the speed, accuracy, or bias towards old stimuli, relative to baseline or novel stimuli). Regarding skill learning, research indicates that the old adage "You can't teach an old dog new tricks" is not universally true. Both simple and complex skills can be acquired well into old age. Two important caveats are worth noting, however. First, the acquisition rate of new skills, and colloquially, new memories, proceeds much more slowly in older adults than it does in young adults. The major implication here is that older adults require more extensive practice than younger adults before skill mastery occurs. Second, even though new skills can be acquired by older adults, a growing amount of research indicates that to the extent that the skill relies on declarative memory or motoric function, age differences in skill performance will be present. This is an important observation because it maps onto a key distinction in the skill acquisition process—the distinction between early and late stages of learning. Each stage relies on different supporting cortical regions, some of which experience more changes with advancing age than others, so that age differences in skill acquisition and

performance may actually represent learning stage differences, and not memory decrements, per se. To illustrate, during the early stage of learning, strategic processes are heavily involved in the monitoring and regulation of the many cognitive processes that become engaged to attain the final goal of successful skill performance. Some of these processes include breaking up the skill into its individual steps, using feedback about performance to make adjustments, and planning the next sequence of actions. With practice and training, these initial steps in skill acquisition become more proceduralized and automated, so that strategic processing becomes less necessary in skill performance. The early stage of learning has been linked to brain activity in the prefrontal cortex, an area that shows significant anatomical changes with advancing age. Once tasks have become proceduralized and less strategic in terms of the cognitive processes involved, however, there is a shift in brain activation from the prefrontal cortex to posterior cortical regions. These latter areas do not experience the same magnitude of change with advancing age as the prefrontal cortex. Such findings indicate that age differences in skill acquisition are stage dependent: age differences are larger during the early stage of learning than during the later stage. This conclusion is supported by the observation that for skills acquired early in life, for which presumably a high level of expertise has been afforded and performance is likely automated, age differences are greatly attenuated, and in some cases even eliminated. Well-learned skills, then, tend to be immune to the effects of aging, whereas newly learned skills may not be expected to be resistant to aging effects.

A number of arguments exist as to why expertise reduces age differences in skilled performance. One argument has been that older experts develop a compensatory mechanism that allows them to offset the negative effects of aging by relying on relevant domain-specific knowledge to enable them to perform at levels comparable to that of young adults. For example, in studies examining older and younger pilots versus nonpilots, age differences in the performance of tasks related to pilot communication activities were present only in the nonpilots. Older pilots compensated for potential age differences in task performance by relying on their knowledge about pilot communication to readily perform the task. Similar types of compensation have been observed in older chess experts, typists, pianists, and bridge experts. These mechanisms are believed to develop unconsciously over time as the aging individual strives to maintain performance levels in the face of decline. Although the compensatory effects of expertise tend to be domain specific (i.e., they have larger buffering effects within areas of expertise than in other areas), arguments have been made that expert performance is supported by a long-term working memory system (see, for example, Horn & Masunaga, 2000). This system is characterized by its ability to hold and manipulate large amounts of information over extended periods of time so that it can be quickly accessed during task performance. This type of memory appears to emerge over time, as expertise develops to allow for superior performance. The evidence from older experts indicates that long-term working memory may be resistant to the effects of aging, although additional research investigating this claim is needed.

Beyond skilled performance, other areas of cognitive function also demonstrate growth or stability in old age. These areas include verbal comprehension, logical reasoning, induction, and concept formation. Collectively, these abilities represent an aspect of mental ability known as *crystallized intelligence* and represent experiential, or culturally valued, knowledge. They generally reflect the development of everyday judgment, understanding, and thinking—skills that mature over time. These abilities are often contrasted with fluid intelligence abilities, those mental abilities that are not acquired through experience or culture. Some examples of fluid abilities are spatial reasoning and perceptual processing speed. Arguments have been made that these abilities reflect central nervous system integrity, so that, consequently, they reveal a pattern of decline in old age. As is the case regarding memory function, with age-related performance dissociations existing between declarative and nondeclarative memory, general intellectual ability also shows age-related performance dissociations, providing additional support for our argument that aging does not produce universal declines in function.

In addition to the issues just described, a growing corpus of research indicates that psychosocial factors such as education, environmental complexity (e.g., community dwelling versus institutionalized living), physical activity, sense of control, and self-efficacy may strongly influence cognitive function to attenuate age differences. For example, older adults with strong perceived control over memory function outperform older adults with weaker perceived control. Similarly,

modifying one's sense of control or self-efficacy regarding memory function (i.e., adopting a more positive perspective) can lead to improvements in memory performance. Combined, these findings indicate that although changes in brain function alter older adults' cognitive abilities, psychosocial and environmental factors can help maintain cognitive competencies—the situational use of cognitive abilities—in old age. Despite the losses to cognitive abilities (with memory loss being the most notable of these changes), cognitive competency, particularly in occupational and daily living activities, can increase across the life span.

Finally, one additional factor that has been shown to provide buffering effects against cognitive decline in old age is the social environment of older adults. Recent large-scale longitudinal studies reveal that greater levels of social engagement (i.e., more contact with friends and family and greater involvement in group activities), as well as greater levels of emotional support from friends and family, can provide some protective effects against cognitive decline in old age. These effects appear to be independent of other factors that might predict cognitive decline, so that social isolation in and of itself has a tremendous impact on the cognitive function of older adults.

SUMMARY

Aging is a complex and often misunderstood process. Although the aging process itself is inevitable, aging does not always produce decline and impairments in function. Gains and losses are both part of the aging process, so that aging can take many different paths. We have focused our discussion on brain changes and their consequent effects on cognitive and mental abilities because these aspects of human behavior have strong ties to an individual's psyche, such that within some individuals, these changes can preclude the development of mood disorders, mental illness, or even dementia. However, most individuals experience these changes without significant deleterious effects in their everyday lives, illustrating a key factor related to successful aging: aging varies across individuals. Although some general conclusions about the effects of biological aging can be made, individuals can play an active role in determining the course and eventual outcome of these changes to minimize decline, maintain stability, and achieve growth, at any age.

—James D. Churchill and Donna J. LaVoie

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AGING PARENTS

Throughout our life span, the family is one of the most stable and reliable relationships we experience. Aging parents in America are thriving within the context of their families. Despite the empirical support for this statement, negative stereotypes about older families persist. It is not uncommon to hear about the threats accruing to aging parents as a function of geographic mobility, family breakdown, and social isolation. Concomitantly, older adults may be characterized as "greedy geezers," placing huge burdens on both the family and society.

Decades of empirical study, however, reveal a picture of families in which aging parents play a key role. Most of this research has been guided by the solidarity model proposed by Bengtson and Schrader in 1982. This model examines intergenerational relations in terms of normative solidarity, affectional solidarity, consensual solidarity, associational solidarity, functional solidarity, and structural solidarity.

Normative solidarity refers to perceptions that one is experiencing usual or typical life events. Indeed, the phenomenon of aging parents is normative. Most older Americans are parents, with 75% to 80% having at least one living child. This, coupled with increased longevity, increase the likelihood of living in a four-or five-generation family. Moreover, this trend is expected to continue; by the year 2020, 60% of women age 50 and older are expected to have at least one living parent. Thus, one can simultaneously *have* aging parents and *be* an aging parent.

Affectional solidarity refers to shared feelings of esteem and affection. The parent-child bond is the strongest familial bond (outside of marriage) and continues to be important to both children and aging parents. However, there is some evidence that these relations may be more important to aging parents, giving rise to the "intergenerational stake" hypothesis. This states that relative to their children, aging parents report higher levels of affection and a stronger desire to maintain contact with other generations. This trend extends to the middle generation, who value their relationships with their own children more highly than they value their relationships with their parents.

Consensual solidarity refers to the degree to which generations agree about fundamental social, cultural, and political views. We know that attitudes and expectations are in flux, making it difficult to adequately gauge the effects of consensual solidarity. Some research suggests that this aspect of intergenerational solidarity is especially important for immigrants and first-generation families.

Associational solidarity is indexed by the frequency of contact between the generations. Associational solidarity is high, with 80% of older parents having some contact with an adult child at least once a week. Not surprisingly, there are gender differences in the frequency of such interactions, with aging mothers reporting higher levels of contact than aging fathers.

Functional solidarity, the exchange of goods and services, flows bidirectionally across contiguous generations. Aging parents may provide child care, financial assistance, and advice; adult children may provide help with household chores, home repairs, and personal care. In late life, parents tend to receive more than they give. When aging parents require assistance, it is family members who provide the bulk of that care.

Structural solidarity focuses on living arrangements. Throughout American history, and continuing today, separate but proximate households are the norm. Only about 20% of the noninstitutionalized elderly reside in households in which two or more generations are present. Gender, age, and race affect the likelihood of multigenerational coresidence. Women are more likely to coreside with nonspouse family members, both as a widowed mother and as an aging daughter or daughter-in-law. As one might expect, the percentage of older adults coresiding with a younger generation increases dramatically with advanced age, with nearly half of adults older than 90 years who live in the community sharing a residence with at least one younger generation. African Americans are more likely than Euro-Americans to live in multigenerational homes.

AGING PARENTS AS CAREGIVERS

Although most parents look forward to launching their sons and daughters into an independent adulthood, some adult children are not able to live independently. Parents of adults with chronic disabilities may experience extended parenting in which the roles they enacted during early childhood continue into that child's adulthood. When sons and daughters experience such lifelong disabilities, it is often aging parents who provide assistance. Two types of chronic disabilities are associated with this extended parenting: developmental disabilities, including mental retardation; and chronic mental illness, such as schizophrenia. In addition, aging parents are often viewed as the "front-line" child care providers when the middle generation requires assistance raising their own offspring.

Providing continued parental assistance to an adult son or daughter with a chronic disability is associated with a host of satisfactions and burdens for aging parents, especially aging mothers. Mothers of adults with chronic mental illness report particularly high levels of caregiving burden, even when they do not reside with their son or daughter. Even in these situations, however, the parent-child relationship is characterized by high levels of affectional and functional solidarity. As in other aging families, the flow of assistance between aging parents and adult children with disabilities is often bidirectional. In fact, most older mothers of adults with serious mental illness receive at least some help from their adult offspring.

A second area in which aging parents provide substantial assistance to younger generations is that of child care. About 22% of adults ages 65 to 74 years

provide child care to family members. In many cases, the older adult resides with the young child. More than 1 in 10 U.S. grandparents raise a grandchild for at least 6 months, with most providing care for 3 years or more. Nearly 5 million U.S. children currently live with grandparents.

The custodial grandparenting role occurs under difficult family crises related to the middle generation, including death, incarceration, divorce, substance abuse, teenage pregnancy, abuse of the child, and abandonment. In a comparison of the effects of various caregiving constellations, custodial grandparents profile as more distressed by their caregiving demands than caregivers to older patients with chronic illnesses.

SANDWICH GENERATION: AGING PARENTS AS CARE RECIPIENTS

The pattern of care shifts within a family such that aging parents begin to receive more assistance than they provide. Whereas 35% of adults ages 65 to 74 provide personal care to someone else, only 12% of those ages 85 and older provide such care. Mothers, old parents, parents in need of support, and parents without a partner receive relatively more support from their adult offspring. Reciprocity, however, continues to characterize relations with aging parents. Even when aging parents are receiving assistance from their adult children, older parents may continue to provide a range of support, including emotional and tangible support (e.g., child care, household tasks).

Middle-aged individuals are sometimes referred to as the "sandwich generation." This term has two levels of meanings. Structurally, it refers to middle-generation cohorts sandwiched between older and younger cohorts in the population. Individually, it refers to people in middle adulthood who simultaneously have relations with their adult children, as they enter and adjust to adulthood, and their aging parents, as they deal with issues of later life. Members of this sandwich generation are presumed to face potential stresses from the combined and competing demands of their intergenerational roles as parents and children.

Despite the attention that this construct has drawn in the popular press, the notion of a sandwich generation may be misleading. First, many of the conflicts middle-aged adults report are due to competing roles in general, not competing generations. Second, conflicting obligations or "sandwiching" can be experienced by anyone who assumes the caregiving role. Research in this area must be viewed in the larger context of generational reciprocity across the life span. It is only in later life, after age 85, that older adults begin to receive more support than they provide. However, even though relatively few middle-aged adults are actively involved in assisting their children and parents, either individually or in combination, at any particular time, there may be substantial burdens for those who are.

In summary, aging parents continue to exert positive influence in society. Families maintain frequent and fulfilling contact across generations. The assistance that is provided within families flows in a bidirectional manner, with the balance shifting toward aging parents as recipients of care in very late life.

—Julie Hicks Patrick and S. Melinda Spencer

See also Older Adulthood

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AGING WELL

Most adults want to live long, in good health, and with an overall sense of well being. *Aging well* describes this goal by promoting positive images and approaches to human aging. Aging well, as opposed to a difficult old age, is the outcome of personal lifestyle choices and behaviors in interaction with supportive physical, social, and cultural environments. Aging

well results from exercising the choices that create a successful, healthy, and productive life. It is a dynamic process that involves the individual in interaction with his or her environment, and is affected by historical events of the time and cultural influences. In many ways, aging well is affected by the resiliency and adaptability of the aging individual. The individual and the environment are interactive, and the positive outcomes associated with aging well are a direct result of personal adaptations and negotiations that take place within this context.

As increasing numbers of people worldwide are living longer and are more active throughout the adult years, archaic views of old age as a time of burden, decay, and decline are quickly being replaced by more positive ideas that focus on active and engaged lifestyles that include choices as we age. Attaining a good old age, or aging well, is an important social goal for countries that are experiencing rapid increases in the percentage of older people in their population. The myths and negative stereotypes about older people that were so dominant during the 20th century are challenged by newer views that convey successful aging, active aging, productive aging, healthy aging, and aging well. These contemporary ideas are aimed at replacing past images of old people as burdens on society with views that focus on positive aging. It is important, however, to be realistic in the images of aging that are presented in the media and ideas that are reflected in social policies and programs because it is an equal disservice to older people to create exaggerated images. Aging well, as both a process and an outcome of personal behaviors coupled with positive environments, may be instrumental to creating a productive adjustment within communities to the enlarging older adult segment of the population.

As a dynamic process, aging well cannot be presented as a single description or prescription of how to live. People age differently within their personal life contexts according to individual characteristics and histories that they bring to older adulthood. A hallmark of the aging population is a great degree of both heterogeneity and diversity. *Heterogeneity* refers to variability within the individual as he or she ages, and *diversity* refers to the position of different groups in relation to one another within society. The two terms are often confused with one another when understanding issues related to the aging population, and both terms are relevant, particularly in reference to aging well. Even though aging is intensely personal, it is still of great public concern and responsibility. To facilitate and promote aging well among adults in different societies around the world, public commitment is needed for providing policies and environments that enhance lifestyle choices for successful, active, productive, and healthy aging, which collectively represent the ideal conditions for aging well.

Aging well is a contemporary idea and perspective that is intended to counteract negative views and practices. Unfortunately, some social policies and programs that were developed to help older people also contributed to the pervasive negative images held of older people. Programs that created voluntary or involuntary retirement, for example, all too often have promoted a sense of role loss, diminished status, and dependence. Early research in gerontology also promoted negative stereotypes of older people. For example, a biomedical approach to aging often conveys growing older as a medical problem in which illness and diseases are the main foci of attention. This perspective encourages society to think of aging in pathological terms and is accompanied by policies and services that target the care needs of helpless, hopeless, and infirm elders. More recent research provides evidence for a different reality, one in which there has been a decline in health problems and disease rates among the older population, such that more positive images of the aging process might suggest a different outlook. As a more positive view of old age, aging well emphasizes the idea that people can adapt and maintain satisfying lives as they age even when, for some individuals, the circumstances are less than optimal.

Considerable work has been completed in recent years to develop the concept and provide research evidence to support aging well. The intention behind the aging well concept is to propose a continuum for studying heterogeneity among people; this continuum is represented by optimal well-being on the positive end and a difficult old age at the other end. Such a conceptual framework will allow the discovery of determinants and causes on a more integrated level of thinking, one that embraces the physical, social, mental, daily life activity, and material well-being of the individual. Aging well is intended to imply not a dichotomy, but rather a continuum that is flexible across cultures, individuals, and circumstances.

The study of aging has a rich and diverse history, representing varied perspectives on what it means to grow old. This history reflects much of the ideology of the times and cultures in which it was developed and presented in the literature. To say the least, how human

aging is currently understood is quite different and clearly evolving from earlier theories of social gerontology. More recently, considerable interest has been aimed at the generation of paradigms and theoretical premises that promote ideas such as successful aging, productive aging, healthy aging, active aging, and aging well; however, much controversy has also arisen around the potential lack of robustness of these concepts to explain a good old age for older people worldwide.

As population aging and globalization continue to affect the lives and lifestyles of older adults, how aging is understood and experienced can be expected to evolve. A single explanation of aging is unlikely and probably not desirable; however, the study of important propositions and social factors that provide foundational explanations of well-being in old age lies at the heart of current conversations about human development across the life span. It is in this context that the concept of aging well has emerged in a broadening range of literature and social action plans, including recent publications of the Second World Assembly on Aging held in Madrid, Spain, in 2002.

In summary, aging well is a person-centered process in which the promotion and protection of physical, cognitive, social, economic, and daily life activities are paramount for achieving a sense of satisfaction and well-being in old age. Aging well is a concept that is recognized as applicable in shaping the public's image of the adult life course. Aging well is both proactive and interactive behavior in response to the circumstances in which adults live—individually and collectively. The test of aging well is directly related to one's outlook and to one's ability to select positive opportunities that will result in a personally satisfying life, as well as social and physical environments that are structured to support aging well versus creating the conditions for a difficult old age. Aging well encourages individuals and societies to envision a desirable future and create a proactive social response that is designed to ensure that future.

—Barbara A. Hawkins

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AINSWORTH, MARY SALTER
(1913–1999)

Mary Dinsmore Salter was born on December 1, 1913, in Glendale, Ohio, but grew up in Toronto, Canada. As a psychology student at the University of Toronto, she became drawn to William Blatz's "security theory," which inspired her dissertation, completed in 1939.

After a stint as instructor at the University of Toronto, Mary entered the Canadian Women's Army Corps in 1942, gaining substantial clinical and diagnostic skills. She returned to the University of Toronto in 1946 and married Leonard Ainsworth, a WWII veteran and graduate student in 1950.

Serendipitously, Leonard's decision to complete his doctoral studies in London led to Mary's collaboration with John Bowlby at the Tavistock Institute for Human Relations, where she was exposed to Bowlby's emerging ideas about the evolutionary foundation of infant–mother attachment. She also admired the naturalistic observations of mother–child separation conducted by Bowlby's research assistant, James Robertson. In 1953, when Leonard accepted a postdoctoral position at the East African Institute for Social Research in Kampala, Uganda, Mary was able to undertake a short-term longitudinal study of mother–infant attachment interactions in Ganda villages. This made her the first researcher to apply and

extend the insights of attachment theory, but her book, *Infancy in Uganda,* was not published until 1967.

After the Ainsworths' move to Baltimore in 1954, Mary performed diagnostic work at a psychiatric hospital and lectured at the Johns Hopkins University, where she was offered a professorship in developmental psychology in 1958. Shortly thereafter, she and Leonard divorced.

In 1963, Mary Ainsworth launched the Baltimore Project, modeled on her work in Uganda. Monthly home visits of 26 families began after a child's birth and ended at 12 months. Detailed narratives captured mother–infant interaction quality during feeding, contact, play, and distress episodes. The final observation, at 12 months, consisted of a mother–infant separation and reunion procedure now known as the "strange situation." Patterns of infant behavior during this laboratory procedure were predicted by maternal sensitivity and harmonious interaction qualities at home. Journal articles and a book, *Patterns of Attachment,* based on the findings were published over the next decade and inspired major longitudinal attachment studies in the United States, Germany, and Israel.

At Johns Hopkins, Ainsworth attracted many graduate students, whose work expanded her findings. This continued at the University of Virginia, where she became Commonwealth Professor in 1975. In 1978, Ainsworth was elected president of the Society for Research in Child Development. Despite mandatory retirement in 1984, she remained professionally active until 1992, when her health began to fail. Among her many honors was the American Psychological Association's Gold Medal Award for Life Achievement in the Science of Psychology in 1998, a few months before her death on March 21, 1999, in Charlottesville, Virginia. Her conceptual contributions and empirical findings have revolutionized how psychologists think not only about infant–caregiver attachment but about close human relationships at all ages.

—Inge Bretherton

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ALCOHOLICS ANONYMOUS

Founded in 1935, Alcoholics Anonymous (AA) is a mutual-help organization for alcoholics, with about 2 million members and 99,000 groups in more than 140 countries. Among individuals who seek help for an alcohol problem in the United States, more than half go to AA—substantially more than those who choose formal treatment.

The structure and function of AA are guided by the Twelve Steps (structuring the therapeutic process) and the Twelve Traditions (governing AA's operation as an organization). Members are encouraged to attend meetings and "work" the steps, often with support from a senior "sponsor." Working the steps requires that members (1) admit powerlessness over their drinking, (2) accept that only a power greater than themselves can relieve them of alcohol dependence, (3) surrender to a higher power, (4) admit to their defects and ask for their removal, (5) acknowledge how they have hurt others and make amends where possible, and (6) help others become acquainted with AA and carry out God's will generally. AA has a spiritual emphasis, but it is noncreedal. AA draws from many traditions, encouraging individuals to interpret "God" as they deem fit.

The Twelve Traditions were developed to preserve AA as an organization dedicated to helping individuals live life free of alcohol. In accordance with these traditions, groups are self-starting and self-governing. No franchise system allots territories or populations to groups, and groups are autonomous and financially independent. Meetings are led by temporary leaders instructed to "serve but never govern." Except for the copyrights on its publications, AA owns no property,

and AA forbids external affiliations and endorsements. AA does not solicit members through promotional activity and receives income only from voluntary contributions.

Ample research suggests that AA is effective in helping individuals remain abstinent from alcohol. Studies of Veterans' Administration (VA) inpatients have reported abstinence rates twice as high among men reporting AA (vs. no AA) attendance. Likewise, Project MATCH, a rigorous clinical trial of individuals seeking treatment for alcohol problems, found that AA attendance predicted higher rates of abstinence during treatment and through the 1-year follow-up. These and similar studies of AA's effectiveness have been challenged on grounds that individuals who choose to attend AA have higher motivation than those who decline involvement, or differ in other ways that could account for the relationship between AA and outcomes. Those concerns have been somewhat mitigated by consistent findings that AA affiliates display *higher* initial problem severity than nonaffiliates. Some evidence suggests that AA is ineffective when involvement is coerced, although naturalistic studies have also found good outcomes under coercion.

AA's approach differs substantially from usual psychotherapeutic practice. There is no professional therapist in attendance at AA meetings. Members are of equal status and help each other, in part by listening, telling their stories, doing service (e.g., setting up chairs and making coffee), and sponsoring others. Further, AA's claim to authority is not based on scientific knowledge, but on tradition, experience, and spiritual beliefs. Nevertheless, many treatment programs now incorporate clinicians with experience in 12-step groups, and some are explicitly modeled on 12-step principles (e.g., the "Minnesota model" approach). Further, most treatment centers now encourage or mandate 12-step attendance.

AA has helped spawn countless 12-step groups for the addictions and other lifestyle problems (e.g., Narcotics Anonymous, Cocaine Anonymous, Overeaters Anonymous, and Obsessive Compulsive Anonymous) and contributed to the formation of various secular alternatives, such as Rational Recovery Systems (founded in 1986), Secular Organizations for Sobriety (founded in 1986), and Women for Sobriety (founded in 1976). Associated groups include Al-Anon (for family members of alcoholics), Alateen (for their teenage children), and Adult Children of Alcoholics.

—Sarah E. Zemore

See also Alcoholism, Substance Abuse

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ALCOHOLISM

WHAT IS ALCOHOLISM? WHO IS AN ALCOHOLIC?

Alcoholism, as lay people generally know it, is the fondness, desire, or even need for alcohol in an extreme sense to the point of addiction. Alcohol is the most widely used legal drug worldwide that also predisposes people to dependence or abuse (addiction) in certain parts of the world. Different cultures have varied features of the extent of alcoholism in their societies, especially with different levels of accessibility, rules, and norms of drinking. For instance, some countries have higher levels of alcoholism (e.g., about 10% of the U.S. population), accompanied by higher levels of people's tolerance for alcohol, and then may consider alcoholism as normal and not deviant. Some others, such as many countries in the Middle East and Asia, have laws and religious prescriptions that encourage the prohibition of the import and sale of alcohol, where society's alcoholism levels, and at times distress levels, are extremely low. On the other hand, there are also some other countries, like France and Italy, where drinking alcohol is acceptable and not regulated, and still addiction to alcohol is low. Moreover, different cultures relate to alcoholism differently. Some cultures deny the existence of alcohol addiction and consider talking about any degree of alcoholism or its consequences as taboo. Other countries minimize alcoholism as an issue or concern that warrants any kind of societal or community attention. Still other societies recognize alcoholism as a mental health issue and spend a substantial portion of their resources in abating the problem. In the United States, the direct and indirect costs of alcoholism

(i.e., money spent for the prevention, detoxification, and rehabilitation of alcoholism and amount spent because of absenteeism, loss of productivity, and medical claims) amount to an exorbitant $148 billion each year.

Psychologists, especially those who work with alcoholics (i.e., therapists and counselors), use the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV-TR)* as a standard reference in defining mental health disorders such as alcoholism. According to the *DSM-IV-TR,* alcoholism is defined by increased tolerance, increased withdrawal symptoms, persistent and compulsive alcohol intake, and distressing consequences in social, occupational, and familial functioning. Increased tolerance is manifested by ever-increasing consumption of alcohol with lessened psychophysiological effects (not getting drunk easily, inhibitions lessened only slowly, personality change not as dramatic) on the drinker. In short, increased tolerance means a greater capacity for alcohol each time to obtain the desired effects. When the alcoholic experiences a period of time without alcohol, he or she exhibits withdrawal symptoms, including shaking, perspiration, and yearning for alcohol. These symptoms are aversive and make it extremely challenging to go without alcohol. With alcohol abuse or dependence, there are inevitable consequences on the person's functioning that may include being unable to go to work regularly; being unable to concentrate in academic work; having conflicted, chaotic, or distant relationships; or being unable to fulfill one's responsibilities of being a father or mother. *DSM-IV-TR* classifies alcoholism on two levels, substance abuse and substance dependence, with regard to its severity and frequency**.** Substance abuse is the pattern of alcohol use that leads to distress for a period of 12 months, whereas substance dependence is the maladaptive pattern of substance use that leads to greater and more extreme impairment for a period of 12 months. Substance dependence is the persistent addiction to alcohol despite greater and more difficult consequences to alcohol intake. Alcohol is the most common drug of abuse and dependence and has a high likelihood of being mixed with other drugs in polysubstance use.

WHAT ARE THE TREATMENTS OF ALCOHOLISM AS A MENTAL HEALTH DISORDER?

As a mental health concern, there have been many attempts, some more effective and efficacious than others, to treat alcohol abuse or dependence. Among them are medical treatment, psychotherapy, lifestyle change, and community interventions. Individual psychotherapy, usually consisting of cognitive-behavioral orientation and techniques, is one of the treatments used when there is availability of psychotherapy and financial resources. The cognitive orientation in therapy taps into modifying the alcoholic's irrational or self-defeating beliefs that fuel the addiction. Psychotherapy using the behavioral orientation aims at providing reward or reinforcement for acceptable behavior and establishing healthy alternative associations that retard the drinking behavior. Group therapy is another form of treatment, whereby a group of six to eight people struggling with alcohol abuse or dependence meets regularly with one or two therapists. Group therapy has proved effective because of the valuable resource each group member is to the other. Moreover, the group lends itself to the value of universality; enables identifying with each other; allows for sharing and encouraging change, information, ideas, and ways of coping; and extends hope and courage among each other. Over the years, community treatments have proved not only cost-efficient but also effective, even to the substance-dependent person. It is for this reason that halfway houses, outpatient groups, and Alcoholics Anonymous have been successful. Alcoholics Anonymous, because its vision is rooted in the quest for spiritual meaning and its essence relies heavily on modeling and companionship, has proved very popular and effective for substance abusers and substance-dependent people. In these forms of treatment, a necessary feature is relapse prevention. Because alcohol abuse and dependence are very challenging to treat, preventing relapse, preparing for relapse, having alternative behaviors, coaching on how to deal with relapse, and planning for this have been essential in treatment. In any form of treatment, a great deal of weight and credibility is accorded to the therapist working with substance use disorders; the therapist is especially effective and trusted when he or she has recovered from alcoholism.

WHAT ARE THE COSTS AND CONSEQUENCES OF ALCOHOLISM?

A great number of consequences to alcoholism have been identified. It is especially obvious to someone living with an alcoholic or loving someone with substance dependence that the costs are huge, the

expenses endless, and the consequences in relationships exorbitant. Alcohol abuse and dependence affect one's ability to be productive at work—attendance at work usually drops with increasing occasions of hangover. The alcoholic's concentration, initiative, and motivation for work are usually jeopardized with addiction to alcohol. There is disruption or loss of a sense of vocation and urgency for a career, and there is indifference about not having a regular source of income. In terms of relationships, alcoholism not only creates distance from strangers (e.g., because of behavior when intoxicated) but also creates estrangement, fear, and threat to relationships that are supposedly important and endearing to the alcoholic. It is unfortunate that the most vulnerable to the relationships fostered with alcoholics are their children, spouses, parents, siblings, friends, and co-workers. These relationships may be characterized by distance, indifference, conflict, anger, chaos, and unpredictability. Because of the alcoholism and changes in the alcoholic's personality and functioning, these relationships are likened to being on an emotional rollercoaster. Psychophysiological changes in alcoholism differ among alcoholics—some people become more extroverted, others more introverted, and still others more expressive of anger or affection; some become impulsive or bolder and exhibit risky behavior. Whatever the changes, however, they all affect the alcoholic's relationships and perceptions of other people, as well as other people's attitude towards the alcoholic. Because inhibitions are depressed by alcoholism, these relationship changes may reinforce the psychophysiological changes. Finally, the most obvious and easily apparent consequence is economic or financial. Although alcohol as a substance may be relatively inexpensive, its abuse or dependence has economic impact in the context of an already impoverished household or when the vocational, social, medical, and intrapersonal consequences have financial repercussions. For instance, an alcoholic father who is laid off from work because of irregular attendance and the lack of productivity is then unable to provide for food, shelter, and health care for his family. Or, for instance, a mother's substance dependence can no longer be tolerated by her husband, who divorces or abandons her without many resources or even takes the children away from her. Continuous and persistent intake of alcohol also presents risks for diseases such as cirrhosis, high blood pressure, stroke, hepatitis, and cancer, which can almost always be very costly, financially and psychoemotionally.

HOW DOES ALCOHOLISM DEVELOP?

It is acknowledged that enumerating the causes of alcoholism may put this discussion at the risk for degrading or blaming the victim. It is thereby the hope that this list of causes conveys the respect for the struggle and predicament of people with alcoholism. Developmentally, drinking alcohol is often first experienced in adolescence. Certain familial, genetic, behavioral, and cultural norms (availability, encouragement of family, prices, accessibility, media and advertisement) and the individual's predisposition all interact to determine whether the adolescent continues to drink in early adulthood and whether the individual pursues abusive drinking into adulthood.

The genetic cause of alcoholism has been confirmed by research; people with parents who are abusers or dependents usually have higher tolerance for alcohol and a higher predisposing risk for addiction. Behaviorally, alcoholism may have been established as a person's way of coping with problems, hardship, or emotional emptiness and depression. Drinking alcohol can also be due to a strong pressure from one's peers and one's community. Relying on alcohol for relaxation and relief from life's challenges can also be learned and may then be passed on to the next generation. Moreover, the psychophysiological effects of drinking may be reinforcing; that is, because the personality and bodily changes to the drinker are perceived as favorable, these effects may be rewarding, and the drinking is reinforced as well, which eventually may lead to abuse and then dependence. Relationally and usually more common in collectivistic cultures, behavioral and emotional patterns are learned in response to the alcoholic. In families with an alcoholic, these patterns may eventually allow the alcoholic to continue with the dependence. For instance, qualitative studies focusing on the spouses and children of alcoholics report that the way of coping with the alcoholic member, which is to survive and cope emotionally and financially by themselves, eventually "allows" the alcoholic to continue with the dependence. A vicious cycle then develops in which the worse the alcoholism becomes, the more the family tries to cope without the help and presence of the alcoholic, and then the more the alcoholic continues with

the dependence, with seemingly no detrimental consequences.

SUMMARY

Alcoholism is defined by people as their experiences and lives witness the addiction in their own or in their loved ones' lives. Psychologists generally use the *DSM-IV-TR* as the standard definition for substance abuse and substance dependence. This definition is used to more effectively treat alcoholism as a mental health disorder. Because alcoholism has been a long-standing concern in most cultures, many forms of treatments have been used. The consequences of alcoholism are costly, not just to the individual (career, intrapersonal, social, personality, economic), but also to the individual's loved ones (relationships, commitments, and responsibilities). As with any addiction, societies have been spending a lot of financial, personnel, and psychological resources in the treatment of alcoholism, especially acknowledging the many causes of alcoholism. It is the soul of changing an addiction in that the desire and intentionality of the alcoholic person are most imperative. In essence, ceasing alcoholism is highly probable only when the alcoholic has set his or her heart on changing.

—Ma. Teresa G. Tuason

See also Addiction, Alcoholics Anonymous, Drunk Driving, Fetal Medicine, MADD (Mothers Against Drunk Driving)

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ALLELES

Alleles are variant forms of a particular gene. Each person carries two copies of each gene (one from their mother and one from their father). They may have two exact copies of a particular gene, or their two copies may vary from each other. The varied forms of a particular gene are called *alleles.* Sometimes alleles are called *polymorphisms* (many forms).

At the molecular level, alleles differ from each other in their DNA sequence. Thus, alleles may vary in the exact sequence of nucleotides, the length of the sequence of nucleotides, or the level of expression of the sequence of nucleotides. The interaction, or lack thereof, of the gene products of the different alleles will determine the phenotype of the individual with regard to that gene pair. Some alleles are dominant over other alleles, such that they determine the phenotype. An example of this is ABO blood types, whereby a person with one A allele and one O allele has type A blood. Recessive (or masked) alleles only show effects in the phenotype when no dominant allele is present. Thus, in blood types, the only way a person can have type O blood is to have two O alleles. Some alleles can interact with each other to produce an intermediate or blended phenotype, or in some cases, both phenotypes are present. An example of this is AB type blood, which results when an individual carries both A and B alleles for this gene pair.

Different alleles may have wide-ranging effects on the trait they influence. Some alleles have very small or mild effects, whereas others have large or even lethal effects on the individual. Some alleles are called

mutant alleles because their expression (alone or with another mutant) results in a mutant phenotype (trait). For example, one form of dwarfism, achondroplasia, is the result of a single dominant mutant allele of the *FGFR3* gene. On the other hand, cystic fibrosis results only when two recessive mutant alleles of the *CFTR1* gene are present in an individual.

One particular type of allele that is receiving much attention is the single nucleotide polymorphism (SNP), in which there is a single nucleotide difference between the two alleles. Some of these changes can drastically alter the function of the gene, whereas some have no effect. There is a concerted effort by geneticists to catalog all of the human SNPs and figure out which of them have important phenotypic effects. Because many of these small differences affect how individuals respond to drugs, cataloging these particular differences may revolutionize the way that physicians treat patients. It is hoped that treatments can be tailored to the individual person with less risk for adverse side effects.

—Therese Poole

See also Genetics/Genetic Testing, Genotype

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ALLERGY

Allergies affect millions of people in the United States and include environmental allergies to pollen, animals, foods, different chemicals, and certain man-made substances. Allergic responses occur when the body reacts to normally innocuous substances in the environment as it would to toxins. The body reads the allergen as an intruder, and the immune system is activated. Responses to allergens often depend on the substance. Airborne allergens most often cause respiratory responses that can range from upper airway reactions such as sneezing and nasal congestion to lower airway reactions such as wheezing and bronchial constriction. Some allergens can cause rashes, itching, or hives, often by contact with the affected area. Food allergens can cause gastrointestinal responses such as nausea, vomiting, abdominal cramping, or diarrhea. In some instances, allergens can enter the circulatory system, either immediately by injection of medicine, for example, or more slowly through digestion or inhalation, and anaphylaxis can occur. Anaphylaxis is rare but serious and involves several body systems, leading to death in some cases.

ALLERGIC RESPONSE

The body's allergic response takes place in three stages: sensitization, mast cell activation, and prolonged immune activation. In the first stage, the allergen first encounters the immune system; although no reaction is produced at this stage, the body is primed for future encounters with the allergen. Immune system cells degrade the allergen and present its fragments to T cells. Antibodies are then created for that particular substance. These antibodies are then distributed to other immune cells in the body. In the second stage, the allergen encounters the body again. The body recognizes the allergen as an intruder, and chemicals are released to combat the allergy, including substances such as histamine and leukotrienes. These chemicals cause the symptoms recognized as an allergy attack. In the third stage, prolonged immune activation, mast cells continue to release the chemical substances and attract other cells to the area. The other cells become involved in fighting the allergen, and the increased production of chemicals can cause cell damage.

AIRBORNE ALLERGENS

Airborne, environmental allergies are the most common type of allergy. These include allergic rhinitis, commonly known as *hay fever,* which is a seasonal allergic reaction caused primarily by pollen from trees and flowers in the spring, grasses in the summer, and weeds in autumn. Symptoms include sneezing, congestion, and watery or itchy eyes. Allergic rhinitis is diagnosed primarily by history of seasonal reactions. Perennial rhinitis with allergic triggers is a year-round condition caused by household allergens like dust, mold, and animals kept as pets. Symptoms and treatment are the same as for allergic rhinitis, but sometimes an allergy test is needed to determine the triggers.

Treatment for rhinitis includes over-the-counter or prescription medication such as antihistamines and decongestants. Antihistamines are generally available

over the counter and can relieve symptoms such as sneezing and watery eyes by blocking the histamines that are released by immune cells. These antihistamines tend to cause drowsiness. For this reason, antihistamines are sometimes combined with decongestants, which have stimulating side effects that counteract the drowsiness. However, decongestants can cause nervousness, restlessness, or insomnia, even while they relieve nasal congestion. Newer forms of antihistamines perform the same tasks as earlier ones, but do so without any sedating effects. These relatively new antihistamines are generally available by prescription and cost significantly more than earlier medications that are available over the counter. Recently, some new forms have become available over the counter as well. Intranasal corticosteroids may be used and cause fewer side effects than earlier antihistamines, but are less effective at treating watery and itchy eyes. Oral corticosteroids may be used on a limited basis (3 to 7 days) for more severe and treatment-resistant allergy symptoms. Allergen immunotherapy, or "allergy shots," can be used in people who have yearly, recurrent, seasonal symptoms of long duration, or perennial symptoms. Allergy shots are not recommended for preschool-age children or the elderly because anaphylaxis can occur. Treatment is also not recommended for longer than 3 to 5 years.

When treating children for allergic rhinitis, nonpharmacological approaches, such as removing the allergen from the environment, are preferred. When this is not feasible, oral antihistamines and nonsteroidal intranasal treatments are the first-line therapy. The sedating effects of some antihistamines are sometimes beneficial for children, allowing them to sleep comfortably. Many later antihistamine medications have not been approved for use with children. Intranasal corticosteroids are effective in children, but some may have a temporary stunting effect on growth, and dosages should be small and monitored routinely.

With adults, precautions should be taken when using allergy medication with the elderly and those with high blood pressure. In the elderly, allergic symptoms are sometimes attributable to drug interactions or side effects of antihypertensive medication. Newer antihistamines that do not cause sedation or performance impairment should be considered. People with high blood pressure should be careful about using antihistamines and use only those medications approved for them.

SKIN REACTIONS

In another form of allergy, there are two kinds of contact dermatitis: irritant and allergic. Both allergic and irritant contact dermatitis can vary in presentation from mild redness, itching, and chapping of skin to severe blistering and ulceration. Only a thorough history and skin patch testing can diagnose allergic contact dermatitis. Patch tests include strips of hypoallergenic tape to which allergens have been applied to the patient's back and are removed after 48 hours. These test sites are evaluated for any reactions. Blood samples can also be used to check for antibody levels, but are not considered as accurate as patch testing. Blood testing is sometimes used in the case of allergic responses that are too severe to risk further exposure to the allergen.

Treatment of allergic contact dermatitis includes avoidance of the allergen as well as a course of prednisone, a steroid, for severe reactions. Prednisone is usually given as a higher initial dose and then tapered off over a period of time. Lower initial doses and more rapid tapering can lead to dramatic rebound of symptoms.

FOOD ALLERGENS

Food allergy is a reaction to something in a food or ingredient in a food, usually a protein. The eight most common food allergens—milk, eggs, peanuts, tree nuts, soy, wheat, fish, and shellfish—are thought to cause more than 90% of all allergic reactions to foods. Other foods have been found to be allergenic for individuals, but are less common. The National Institutes of Health estimated that 5% to 8% of children and 1% to 2% of adults have a true food allergy. Symptoms of food allergy vary from person to person and can also vary in the same person on different exposures. Symptoms can range from skin irritations such as rashes, hives, and eczema, to respiratory symptoms like runny nose, sneezing, and shortness of breath. In more severe cases, anaphylactic shock can occur. Symptoms of anaphylaxis usually appear rapidly and can include swelling of the throat, difficulty breathing, lowering blood pressure, and unconsciousness. Standard emergency care includes an injection of epinephrine and immediate medical attention for further evaluation.

Not all adverse reactions to foods are true food allergies; instead, they are food intolerances or food idiosyncrasies, which are generally localized and

temporary and rarely lifelong. Food intolerance is an adverse reaction to a food or additive that involves digestion or metabolism but does not involve the immune system. An example is lactose intolerance, whereby a person lacks an enzyme needed to digest milk sugar. Food idiosyncrasy is an abnormal response to a food or food substance, but also does not involve the immune system. Sulfite sensitivity is an example.

At this point, the only way to treat food allergy is to avoid the food that causes the reaction. If a reaction occurs, then a person has several options of treatment, depending on the severity. Severe food allergy requires that the allergic person carry an epinephrine injection at all times in case of accidental ingestion or exposure. For less severe reactions, antihistamines or asthma inhalers are sometimes used to treat symptoms. Initial trials of vaccines to combat against allergic responses to certain foods are being conducted.

ALLERGIES AND ASTHMA

Although asthma and allergies do not always occur together, an estimated 70% to 75% of people with asthma have allergic triggers for their asthma. Asthma can be triggered by a host of different allergens and can trigger airway constriction, coughing, and wheezing.

PSYCHOLOGICAL IMPACT

It is currently unclear what, if any, psychological impact having allergies has on the average person. Many people who suffer from allergies treat their symptoms as needed and go on with their lives. Some people with severe, life-threatening allergies may experience extra stress because of their allergies and may suffer from increased anxiety. The phenomenon has been most studied in children, in whom there is some evidence of an increased association between allergies and some anxiety disorders, such as panic disorder. This evidence is in line with research showing that asthma is sometimes associated with an increased risk for anxiety disorders. As with any chronic illness, someone who is experiencing stress related to their illness may be helped by treating symptoms of anxiety.

—Kimberlee M. Roy and Michael C. Roberts

See also Asthma

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ALTRUISM

Philosophers throughout the ages have debated whether humans actually intend to perform altruistic actions, actions that are beneficial to others and costly to the actor, without any clear resolution. In recent decades, psychologists have addressed the long-standing philosophical debate over the existence of altruism, usually defined as unselfish concern for the welfare of others, with empirical studies. Categorizing an action as altruistic often implies that the decision to perform the action was not influenced by consideration for the self or the possible benefits to the self that may accrue from performing the action.

PSYCHOLOGICAL RESEARCH ON HELPING

Psychologists have studied helping behavior from a variety of perspectives. For example, Latane and Darley have developed a five-step cognitive model of bystander intervention. These steps consist of: (a) noticing the event, (b) interpreting the event as requiring help, (c) assuming personal responsibility, (d) choosing a way to help, and (e) implementing the decision. This model has been shown to be applicable to both emergencies and nonemergency situations. Behaviorists have demonstrated that helping behaviors can be increased by direct reinforcement and modeling, and social psychologists have shown that helping is more likely to occur when the rewards of helping outweigh the costs. Psychologists have also uncovered characteristics of the target that increase the chances of helping, such as attraction based on attractive physical appearance, friendly behavior or personal qualities, and similar racial characteristics.

RECENT PSYCHOLOGICAL RESEARCH ON ALTRUISM

Batson and colleagues' empathy-altruism hypothesis proposes that a truly altruistic motivation can be evoked by empathic concern toward another person for whom the benefit is directed. Actions based solely on the motivation to benefit another are proposed to result from a series of cognitive events. In the enabling stage, the observer takes the perspective of the needy target, which may be stimulated by perceived similarity between oneself and the other, by instructions to take the other's perspective, or by an attachment such as kinship, friendship, or prior contact. This leads to an emotional response of empathic concern, including feelings of sympathy, warmth, tenderness, and compassion, resulting in a desire to improve the other's welfare, rather than one's own welfare.

Although altruist advocates admit that human motivation is frequently for self-benefit, they see the need for a pluralistic explanation of helping behaviors that includes both altruism and egoism. Studies supporting the empathy-altruism hypothesis have systematically varied on whether individuals can only obtain egoistic goals by helping, or whether they can escape from the situation and obtain the egoistic goals without helping. These studies purportedly demonstrate that at least some people have helping intentions that are not explained by egoistic motivations, such as the relief of personal distress (as proposed by Aquinas and Hobbes), escaping public shame for not helping, the relief of sadness, and the desire to make oneself happy.

Other researchers assume psychological egoism, the thesis that people always try to act in ways that benefit themselves. Cialdini and associates have proposed that it is the sense of self–other overlap, or "oneness," between the helper and the individual in need that motivates helping, rather than empathy. Helping others with whom one feels commonality would not be selfless because it leads to a more favorable mental state. Egoist advocates suggest that empathic concern is an emotional signal of oneness and that empathy per se at best leads to superficial helping.

Studies examining whether the effect of empathic concern can be eliminated when the sense of oneness with the target, or self–other overlap, is accounted for have produced contradictory results. One philosophical objection to the egoist argument is that seeing the other as part of the self is in itself altruistic. The perceived overlap implies that the self and other share a common fate, so that resources and other assistance may be shared to maximize outcomes for more than just the individual.

UNDERSTANDING ALTRUISM IN AN EVOLUTIONARY FRAMEWORK

Integrating concepts from evolutionary theory enhances the psychological framework for understanding altruistic helping intentions. An evolutionary approach promotes the understanding of affect, cognition, motivation, and behavior as expressions of functional, adaptive processes that evolved through natural and sexual selection to solve problems in our ancestral environments. The altruism debate may be clarified by disentangling proximate motivations and ultimate selection pressures. An evolutionary framework acknowledges the possibility of both altruistic and egoistic motivations from the perspective of the individual. From an evolutionary perspective, subjective experiences underlying an adaptation can vary, as long as they reliably lead to adaptive behaviors. The underlying motive or subjective experience of the individual is less important than the consequences of their actions. This allows for the possibility of behaviors that are altruistic in terms of costs and benefits to the donor, although egoistic in terms of the benefit to the genes shared by the individuals.

William Hamilton's inclusive fitness theory explained that by assisting in a time of need, one could help his or her relative become an ancestor of offspring with similar genes. Kin selection, a genetically influenced tendency to differentially help relatives, is likely to spread across a population when the cost in reproductive fitness to the donor is less than the product of the fitness benefit to the recipient and the proportion of genes that the donor and recipient share. Nepotistic acts encouraged by kin selection include the altruism advocates' example of a mother rushing to help her injured child.

Consistent with evolutionary theory, the experience of oneness or empathy could arise as a consequence of attachment-related cues (kinship, friendship, familiarity) that signaled the potential for relatively high genetic commonality in our ancestral environment. The psychological states provoked by these cues could increase the chances of the needy individuals receiving assistance, enhancing the survival and replication

of genes influencing the psychological capacities for oneness and empathy. A number of studies have found support for predictions derived from kin selection in psychological mechanisms influencing helping, behavioral intentions to help, and actual helping behaviors.

Kin selection is not the only recognized evolutionary pathway for altruistic actions. Trivers' theory of reciprocal altruism predicts that altruistic behaviors will also be a function of beliefs about the recipient's likelihood of reciprocating. The exchange of resources and support in times of need is adaptive owing to benefits conferred to the viability of the group as a whole. Solitary altruistic actions will occur because the donors may some day find themselves in need and could expect to benefit from help. As long as this occurs, altruistic actions benefiting nonrelatives will occur. The social environment in the ancestral environment encouraged the development of reciprocal altruism because the relative social isolation increased the chances that other altruists would benefit from others' altruistic behavior. One recent study found that cognitive mechanisms facilitating reciprocal altruism accounted for the greatest portion of the variance helping intentions, more than all other effects combined.

The mental events facilitating reciprocity are usually depicted as cognitive mechanisms evaluating the likelihood that the target would provide help if conditions in the situation were reversed. In recent years, this cognitive perspective has been supplemented by the recognition of emotional pathways that are consistent with the adaptive framework of evolutionary psychology. Emotional bonding with others promotes commitment to helpful actions that are performed for the benefit of the other individual, rather than for an expected favor in return. Over time, individuals may benefit from having maintained these relationships, rather than severing ties if helping actions are not immediately reciprocated. Those individuals who eventually find themselves in need will gain from the more elastic form of reciprocal altruism facilitated by emotional commitments. Of course, repeated violations of the norm of reciprocity may attenuate emotional commitment with another.

Altruistic actions performed for "the good of the species" are usually rejected because natural selection operates more effectively within breeding populations than between them. Since the 1960s, arguments for group-selecting altruistic arguments have been discounted by most evolutionary biologists. Assuming that the tendency to sacrifice oneself for the sake of one's group varies among individuals within groups, those with more selfish tendencies will survive better than their more altruistic neighbors. This would lead the group to eventually become more selfish in nature. In recent years, more sophisticated arguments for group selection have revived this debate. However, the newer group selection models mirror those of individual level selection; therefore, they can be mathematically transformed into each other. It is also possible that genuine group-selecting altruistic actions have been generated from cultural influences and that groups benefiting from these actions are more successful than other groups, although this has not resulted in novel genetic adaptations for helping behaviors.

CONCLUSION

In conclusion, actions that are altruistic from the perspective of the proximate mental motivation of individuals are consistent with evolutionary adaptation. Proximally altruistic mechanisms may operate within a genetically selfish system. Actions that are genetically altruistic, those that reduce one's inclusive genetic fitness, will be extremely rare. Studies have indicated that psychologically altruistic and egoistic pathways for helping behaviors may operate simultaneously.

—Daniel J. Kruger

See also Emotional Development

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ALZHEIMER'S DISEASE

Alzheimer's disease (AD) is a progressive, neurodegenerative disease that accounts for 50% to 75% of all dementias affecting older adults. AD affects 5% to 10% of all adults older than 65 years, and this proportion doubles every 5 years over 65; consequently, it is a major health concern in the United States. About 4.5 million people had the disease in 2004, and this number will rise to about 11 million by 2025. Considering that most individuals with AD spend at least some time in a full-care facility, health care costs associated with the disease are high. Costs associated with AD in 2004 approached $1 billion per year, and these will continue to increase as the population ages. The high incidence of institutionalization stems from the cognitive effects of the disease. People with AD gradually become unable to accomplish everyday tasks like driving and cooking; their abilities to communicate and manage their own grooming and self-care deteriorate, and eventually control of bodily functions and motor abilities is lost. However, the most devastating effect, particularly for family members, is the gradual deterioration of personality: Affected individuals lose interest in hobbies and outside events, fail to recognize family members, and eventually cease to interact with the world around. Thus, the disease is devastating on both societal-economic and personal-familial levels. Intense research continues to investigate etiological factors, cognitive sequelae, and treatments for this debilitating illness.

BIOLOGICAL AND GENETIC CHARACTERISTICS

The characteristic histological markers of AD are intercellular neuritic plaques and intracellular neurofibrillary tangles. Plaques occur in the spaces between neurons and comprise a beta-amyloid (β- amyloid) protein core surrounded by a cluster of dead and dying neurons. Neurofibrillary tangles consist of the tau protein fibers that normally organize and give shape to a cell but that have become deformed, possibly as a result of interaction with β-amyloid. The tau protein aggregates into intracellular tangles that block the normal flow of nutrients and information within the neuron. Consequently, the number of synapses the cell can maintain with other cells diminishes, and eventually the cell dies.

Amyloid proteins transport cholesterol throughout the body and brain so that it can be used for cellular repair. β-Amyloid is one of three common variants of the amyloid protein, and unlike other variants, none of the enzymes normally produced by the body can break it down. Moreover, the β-amyloid protein is particularly sticky and has been associated with the deposition of fatty cholesterol deposits in blood vessels as well as with neuritic plaques in AD. Consequently, the individual who has this version of the amyloid protein is at risk for cardiovascular disease in addition to AD. β-Amyloid protein is encoded by a particular gene on chromosome 19, known as the *apolipoprotein ε4 (ApoE4)* gene. This gene variant cuts the amyloid precursor protein in a different place than normal, yielding the insoluble β-amyloid. Like all genes, individuals have two copies of the *ApoE* gene. People carrying one copy of *ApoE4* (about 25% of the population) have a higher risk for AD than individuals with other variants of the *ApoE* gene; individuals who carry two copies of the *ApoE4* gene (about 2% of the population) have a much higher risk for developing AD at a younger age than those with only one copy of the gene. In fact, the *ApoE4* gene variant accounts for about 50% of all cases of *late-onset AD,* that is, AD diagnosed after age 60. Furthermore, compared with noncarriers, carriers of the *ApoE4* gene show metabolic differences in their brain in the same areas that are affected by AD as early as age 30; however, cognitive differences are minimal or absent between noncarriers and carriers of the *ApoE4* gene from age 30 to 55. *Early-onset AD* refers to the 1% of AD cases that are diagnosed in people in their 40s and 50s, caused by mutations to genes other than *ApoE.* In addition to genetics, other risk factors for AD include increasing age, family history of AD, previous head trauma or stroke, and lower education and verbal ability.

AD preferentially targets brain centers that control higher cognitive abilities. The hippocampal region in

the medial temporal lobe is affected first, hampering the ability to encode new memories, followed by the posterior cingulate, which is instrumental in making and evaluating decisions. Subsequently, the multimodal association cortices in the temporal and parietal lobes show signs of the disease, leading to difficulties with language use and spatial-temporal orientation. Later, the prefrontal cortex shows signs of the disease, which is reflected in attentional and behavioral deficits, as discussed subsequently.

DIAGNOSIS

Physicians suspect AD might be present when individuals show a decline in memory ability and at least one other cognitive domain (e.g., language, orientation in time and space, or executive functions) that affects their daily occupational and social activities. Furthermore, this decline must have a gradual onset and must continue over time. To make a clinical diagnosis of AD, the doctor must exclude a number of other possible causes for this decline. Physicians use in-depth interviews, blood tests, and brain imaging (usually computed tomography scans or magnetic resonance imaging) to rule out depression, drug interactions, endocrine disorders, nutritional deficiencies, head trauma, brain tumor, and stroke as causes of decline before making a diagnosis of probable AD. It is still not possible to make a positive diagnosis of AD until autopsy; however, imaging techniques that highlight amyloid deposition in the brain have been developed recently that may allow in vivo diagnosis of AD in the near future.

COGNITIVE CHARACTERISTICS

AD has profound effects on cognition, speech, and overall behavior that vary individually, depending on the sequence in which different parts of the brain are affected. By the time individuals are diagnosed with AD, usually at the very mild or mild stage of the disease, damage to hippocampus and posterior cingulate is typically already relatively severe, leading to deficits in learning new information, short-term memory, autobiographical memory, and judgment. Consequently, people with AD often repeat questions and stories and make poor decisions because they cannot assimilate new information. Additionally, these individuals often have word-finding problems and difficulty expressing themselves, and their attentional and spatial impairments make driving hazardous. Even at this mild stage of the disease, individuals have severe difficulty with organizing, planning, problem solving, and abstract reasoning. Typically, individuals are aware of their deficits and are often depressed and irritable. As the disease progresses, this awareness diminishes while memory and language problems increase.

At the moderate stage of the disease, typical, daily activities become increasingly difficult: the individual cannot prepare meals, use tools, or even take telephone messages. Although automatized tasks like self-grooming may be preserved, concerns about personal hygiene and appearance often suffer. Speech becomes vague and usually includes an overabundance of pronouns replacing more specific nouns, whereas the ability to comprehend complex sentences and discourse deteriorates. At this stage of the disease, many people with AD feel a profound restlessness and may begin to wander away from home. Because they become easily lost and often cannot remember their address or phone number, wandering can be a serious problem. Sleep difficulties, hallucinations, and personality changes are also common at this stage of the disease.

At the severe stage of AD, individuals slowly lose interest in their surroundings. Their ability to communicate relevantly declines and eventually disappears, as they lapse into mutism. They can no longer groom themselves and become incontinent. Additionally, they may not recognize common items, including food, and may have difficulty swallowing, which can lead to resistance to eating and drinking and subsequent malnutrition. They become agitated over changes in routine, and the loss of personality is profound. Eventually, they become bedridden and unresponsive; death, however, is usually due to infection or other complications.

TREATMENT

Current treatments for AD are based on the fact that AD affects the brain's ability to produce many of the neurotransmitters crucial for memory and cognition. The primary drugs used in early AD, tacrine and donepezil, are acetylcholinesterase inhibitors, which prevent the breakdown of acetylcholine, a neurotransmitter necessary for memory function. In about 50% of individuals with early AD, these drugs minimize or slow the deterioration of cognitive abilities and help control behavioral problems, such as depression,

agitation, and insomnia. Research to develop a vaccine that would prevent the accumulation of β-amyloid in the brain is in progress, but to date has been unsuccessful.

Maintaining communication with the individual with AD can help mitigate the burden the disease places on caregivers. Certain strategies can facilitate this communication, such as minimizing environmental distractions, limiting the use of pronouns and complex grammar, maintaining eye contact, and repeating or paraphrasing important information. Caregivers should also be encouraged to take advantage of home health care and adult day care services where available, as well as support groups, because the constant demands of caregiving can be debilitating both physically and emotionally.

In summary, AD is a devastating disease with enormous human and economic costs that will continue to increase as the population ages. However, research continues to identify ways to treat the disease and to improve quality of life for individuals with the disease and their caregivers.

—Lori J. P. Altmann and Claudia A. Morelli

See also Dementia, Long-Term Memory, Memory Failure

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AMERICAN ACADEMY OF PEDIATRICS

The American Academy of Pediatrics (AAP) was founded in 1930 at Harper Hospital in Detroit. A group of 34 physicians who specialized in children's health convened in the hospital's library to set forth the future of America's children, acknowledging the differences between adult and child health care. They settled on the name *American Academy of Pediatrics* because it best represented the commitment to all children and the pediatric specialty.

Today, the AAP is a not-for-profit, 501(c)(3) Illinois corporation organized for scientific and educational purposes, with a strong presence in the United States and overseas. The organization has a membership of 60,000 pediatricians; pediatric medical subspecialists, including neonatologists, allergists, and cardiologists; and pediatric surgical specialists. The AAP employs more than 350 people, who work at AAP headquarters in Elk Grove Village, Illinois, and in Washington, DC, where legislative and federal activities are managed.

MISSION AND ORGANIZATIONAL STRUCTURE

The mission of the American Academy of Pediatrics is to attain optimal physical, mental, and social health and well-being for all infants, children, adolescents, and young adults. The AAP's mission is carried out in a number of ways. The organization is governed by a 13-member board of directors who maintains the integrity of the AAP mission by following a set of organizational bylaws. The board comprises an executive committee and directors. These pediatric health practitioners are elected by AAP members and serve as chairs representing 10 geographic districts.

Internally, staff in the Office of the Executive Director handles Board Administration, Development/Fundraising, Communications, International and Interprofessional Affairs, Human Resources, and the Customer Service Center. Other staffed areas within the AAP include separate departments according to specialty. These areas are the Departments of Chapter and State Affairs; Community and Specialty Pediatrics; Practice; Research; Education; Finance and Administrative Services; Information Technology; Marketing and Publications; Membership; and Federal Affairs (based in Washington, DC).

Another important facet of the AAP is a grassroots network of 59 chapters in the United States and 7 in Canada. Each state and local chapter is individually incorporated, has its own bylaws, and is managed by local pediatricians. Most have a staff executive director. Chapter leaders strive to fulfill the AAP mission on the state and local level and work to implement other local priorities on behalf of children and adolescents.

EDUCATION AND ADVOCACY

The AAP receives funding from a variety of sources, including membership dues, individual contributions, and unrestricted educational grants from foundations,

corporations, and government entities. These valuable resources help support more than 200 AAP-sponsored programs every year.

Programs cover a broad range of issues, such as neonatal resuscitation, obesity, childhood immunization, breast-feeding, car-seat safety, media literacy, prevention, and health promotion. Patient and family brochures on these and other topics are available to the public and health professionals, and a series of child care books written by AAP members is featured in the AAP bookstore.

The AAP sponsors ongoing continuing medical education (CME) courses and is considered the premier source of CME for pediatricians. These courses help advance the professional education of AAP members and are held in hospitals, universities, and other settings around the United States as well as through Internet-based learning environments.

More than 30 AAP national committees, covering issues ranging from adoption and infectious diseases to violence and poison prevention, are responsible for creating the organization's policy statements. These statements appear in *Pediatrics,* the AAP's monthly scientific journal and are used as recommendations in pediatric care.

Additionally, the AAP has more than 50 sections consisting of more than 30,000 members with interests in specialized areas of pediatrics, such as surgery, ophthalmology, breast-feeding, critical care, endocrinology, and pediatric dentistry. Section members present current research and practical knowledge in their respective subspecialties during various scientific meetings throughout the year, including the AAP's National Conference and Exhibition (NCE).

Federal advocacy initiatives have been handled by staff at the AAP's Department of Federal Affairs, based in Washington, DC, for more than 30 years. Pediatricians active in child advocacy collaborate with lawmakers to help ensure that the health needs and concerns of all children are covered as legislation and public policy are developed. An annual legislative conference in Washington, DC, brings together pediatricians, lawmakers, and other concerned individuals to address current issues and public policy.

On the state level, AAP staff provides technical assistance to chapters on a variety of issues, including Medicaid, child safety, and immunizations. Chapter leaders maintain relationships with local and state lawmakers, working with them on advocacy, policy, and other legislative initiatives.

ACADEMY SUCCESSES AND MILESTONES

During the past 75 years, the AAP has earned a proud place in the advancement of child and adolescent health, serving as pioneers in a variety of areas. Among the most notable are the following:

- The AAP Task Force on Infant Sleep Position focused on sudden infant death syndrome (SIDS.) The task force developed a landmark 1992 AAP policy statement that urged parents and guardians to put infants to sleep on their backs to prevent SIDS. As a result of this effort, dubbed "The Back to Sleep Campaign," more than 10,000 infants are alive today.

- The Academy's immunization initiatives have increased immunization rates among children and adolescents and lowered the incidence of infectious childhood diseases such as polio, measles, chicken pox, and pneumonia. This was accomplished through an organized grassroots effort facilitated by local pediatricians and the AAP chapter network.

- More than 1 million pediatricians and other heath care professionals in the United States and overseas have been trained in the AAP's Neonatal Resuscitation Program (NRP.) The NRP, launched in 1987, has become the standard of care for treatment of newborns at birth. Additionally, NRP materials have been translated into 22 languages and introduced in 71 countries.

—Deborah M. Bullwinkel

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AMERICAN ASSOCIATION OF RETIRED PERSONS (AARP)

BEGINNINGS OF AARP

The American Association of Retired Persons (AARP) is a nonprofit, nonpartisan membership

organization for people age 50 years and older with more than 35 million members. According to its literature, AARP is dedicated to "enhancing quality of life for all as we age," and the organization also provides a range of benefits and services. Despite its name, anyone older than 50 may join, retired or not. Its mission is to inform members and the public of issues important to Americans older than age 50; advocate on legislative, consumer, and legal issues; promote community service; and offer specialized products and services to members.

AARP was founded in 1958 by Dr. Ethel Percy Andrus, a retired high school principal, and was modeled after the organization also found by Andrus in 1947, the National Retired Teachers Association (NRTA). Part of the impetus to create the NRTA was to assist older Americans in their efforts to obtain health insurance, usually unavailable at that time. Once Andrus realized how significant this need was, the AARP was formed and opened to all older people, not just teachers.

AARP MISSION

AARP focuses a significant part of its resources on education and in doing so publishes the bimonthly *AARP Magazine,* which covers a broad range of topics related to aging such as health, finance, and leisure. Members of AARP also receive the *AARP Bulletin*, published 11 times a year, which includes information regarding relevant federal and state legislation. In addition, *Segunda Juventud,* a quarterly Spanish-English newspaper, is published as well. In addition to offering these publications, AARP uses its Public Policy Institute to conduct and publish research on aging issues.

AARP PROGRAMS

AARP offers several types of programs to meet the needs of its members and to address some of the at-large policy issues that aging Americans face.

The AARP Independent Living/Long-Term Care/End-of-Life Issues program addresses issues of prevention and examines options in services and financing. The physical activity initiative is targeted at increasing the number of people who make physical activity a regular part of their lives. Finally, the predatory lending campaign is aimed at reducing the incidence of fraud against older homeowners.

With older Americans finding it increasingly challenging to drive safely as they age, the AARP driver safety program is an 8-hour classroom refresher course designed for drivers age 50 and older. It covers rules of the road, defensive driving tips, and normal physical changes that accompany aging and ways to compensate for them.

The AARP grief and loss programs offers resources and information to AARP members and their families who have experienced the loss of a loved one. The program develops and offers bereavement outreach services, support groups, and educational programs for bereaved individuals.

AARP Tax-Aide, administered through the AARP Foundation, is a free tax counseling and preparation service for all taxpayers with middle and low incomes, with special attention to those age 60 and older. Trained and certified volunteers serve almost 2 million taxpayers.

Finally, AARP Senior Community Service Employment Program (SCSEP)) is a work-training program for low-income people age 55 and older.

—Neil J. Salkind

See also Retirement

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AARP The Magazine, http://www.aarpmagazine.org
American Association of Retired Persons, http://www.aarp.org/

AMERICAN PSYCHOLOGICAL ASSOCIATION

The American Psychological Association (APA) formed over a century ago to promote the exploration of psychology through research and clinical practice. This impressive association is the largest and most influential psychological organization today.

HISTORY AND MISSION

The APA was formed in 1892 at Clark University in Worcester, Massachusetts. Originally comprised of 26 members, its current membership has expanded to more than 150,000. The APA continues to use its size and power to aid psychological practice and research.

An excerpt of the APA's mission, found in its bylaws, is as follows:

> The objects of the American Psychological Association shall be to advance psychology as a science and profession and as a means of promoting health, education, and human welfare by: the encouragement of psychology in all its branches . . . the promotion of research in psychology. . . . the improvement of the qualifications and usefulness of psychologists . . . the increase and diffusion of psychological knowledge . . . the promotion of health, education, and the public welfare.

STRUCTURE AND LEADERSHIP

The APA's bylaws supersede all other internal rules of the APA and can only be changed by vote of the entire membership. These bylaws establish the leadership structure of the APA, which includes a council of representatives, a board of directors including the APA officers, and a central office. The APA's council of representatives, selected from the divisions and state and provincial psychological associations (SPPAs), votes in six board members and has control over its budget. The board of directors heads the organization in all business aspects and is comprised of these six members appointed by the council of representatives and six APA officers elected by the APA membership. These officers include the APA president, past president, president elect, treasurer, secretary, and chief executive officer.

The APA generates more than $71 million through membership dues, investments, publications, and real estate. There are 53 professional divisions in the APA, which reflect specialties and interest areas (such as the Society for the Teaching of Psychology, Society of Clinical Psychology, Society for Industrial and Organizational Psychology, and American Psychology-Law Society, among others.)

The APA promotes education in psychology, research and scientific affairs in psychology, the clinical practice of psychology, and the dissemination of psychological information. Serving as the accrediting board for advanced degree programs in psychology, the APA currently accredits more than 355 doctoral psychology programs, 469 doctoral internships, and 15 postdoctoral residency programs. The APA also approves organizations to be continuing education providers to maintain and advance the skills and competency of its licensed practitioners.

In the area of research and scientific affairs, the APA provides advanced training institutes (ATIs), which instruct psychologists on up-to-date methods and techniques in research. The APA also promotes research by annually funding graduate students through dissertation research awards. The APA's science policy staff endeavors to ensure that psychological research and knowledge are used in legislative policy decision making, and its Amicus Briefs on relevant, psychological issues also promote the use of relevant psychological knowledge within the legal system. The APA also strives to more generally disseminate psychological knowledge through its journals, books, and electronic databases such as PsychINFO, PsychARTICLES, and the APA Web site. The 49 APA journals are the premiere journals in psychology, publishing no less than 1,798 empirical and conceptual articles in 2002.

The APA supports its clinical practitioners and the consumers of psychological services, for example, by providing strong legislative advocacy for managed care reform in the mental health area. The APA's *Ethical Principles of Psychologists and Code of Conduct* guides practitioners, teachers, and researchers of psychology to ensure the integrity of the profession and welfare of its clients.

SUMMARY

The APA is a large, influential organization that focuses on psychology, its development, its impact, and clinical practice through its varying publications and 53 divisions.

—Kristin M. Day and Karen E. Mottarella

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AMERICAN PSYCHOLOGICAL SOCIETY

The American Psychological Society (APS) is the leading national organization devoted solely to scientific psychology. Its mission is to promote, protect, and advance the interests of scientifically oriented psychology in research, application, and improvement of human welfare.

Established in 1988, the APS was instantly embraced by psychology's scientific community, and its membership grew rapidly. By the end of its first year, APS opened an office in Washington, DC, and now has about 15,000 members from around the world. Members are engaged in scientific research or the application of scientifically grounded research spanning all areas of psychology. There are also student affiliates and institutional members. Distinguished contributions are recognized by fellow status.

FORMATION

The APS was created out of recognition that (a) the needs and interests of scientific and academic psychologists were distinct from those of members of the professional community primarily engaged in clinical practice and (b) there was a strong need for a society that would advance the interests of the discipline in ways that more specialized organizations were not intended to do. An interim group, the Assembly for Scientific and Applied Psychology (ASAP), had sought to reform the American Psychological Association from within, but their efforts were rejected by an APA membership-wide vote. The APS then became the official embodiment of the ASAP reform effort, and the new organization was launched on August 12, 1988.

PUBLICATIONS

The APS publishes three journals: (a) *Psychological Science* publishes authoritative articles of interest across all of scientific psychology's subdisciplines; (b) *Current Directions in Psychological Science* offers concise, invited reviews spanning all of scientific psychology and its applications; and (c) *Psychological Science in the Public Interest* provides definitive assessments by panels of distinguished researchers on topics on which psychological science has the potential to inform and improve the well-being of society. The APS also publishes the monthly *Observer,* featuring news and opinion pieces; a *Current Directions Readers* series in conjunction with Prentice Hall; a *Festschrift* series in conjunction with LEA Press; and self-published books on the teaching of psychology.

ANNUAL CONVENTION

The APS holds a meeting in late spring each year to showcase the best of scientific psychology. The program features presentations by the field's most distinguished researchers and educators in a variety of formats, including invited addresses and symposia, submitted symposia, "hot topic" talks, and posters. The convention also includes workshops on specialized topics.

APS FUND FOR THE TEACHING AND PUBLIC UNDERSTANDING OF PSYCHOLOGICAL SCIENCE

In 2004, the David and Carol Myers Foundation pledged $1 million to the APS for the creation of an endowed fund that aims "to enhance the teaching and public understanding of psychological science for students and the lay public, in the United States, Canada, and worldwide."

ACHIEVEMENT AWARDS

The APS recognizes exceptional contributions to scientific psychology with two annual awards: (a) the APS William James Fellow Award for significant intellectual contributions to the basic science of psychology and (b) the James McKeen Cattell Fellow Award for outstanding contributions to the area of applied psychological research.

APS STUDENT CAUCUS

Students are an important and active component of APS. The APS Student Caucus (APSSC) is the representative body of the society's student affiliates. The APSSC organizes research competitions, convention programs, and a variety of membership activities aimed at professional development and enhanced education in psychological science.

ADVOCACY

The APS is widely recognized as an active and effective leader in advancing the interests of basic and applied psychological, behavioral, and social science research in the legislative arena and in the federal agencies that support these areas of research.

—Robert. W. Levenson and Sarah Brookhart

Further Reading and Reference

American Psychological Society, http://www.psychologicalscience.org

AMERICAN SIGN LANGUAGE (ASL)

American Sign Language (ASL) is the principal language of the signing deaf community in the United States. There are estimated to be as many as 500,000 ASL signers, making it one of the most frequently used languages in North America. ASL, however, is only one of many sign languages used by deaf people around the world; deaf people in most countries have their own distinct sign language.

ASL has not always enjoyed such widespread popularity. Educational opportunities for deaf children were practically nonexistent in postcolonial America, and Thomas Hopkins Gallaudet (1787–1851) sought to remedy this situation. Nearly 200 years ago, Gallaudet set out to learn how Europeans taught deaf children. He was impressed by a school for deaf students in Paris, an institution that included instruction in sign in its educational program. Gallaudet persuaded a deaf teacher at this Paris school, Laurent Clerc, to return with him to America. In 1817, Gallaudet and Clerc helped found the first U.S. public school for deaf students. Clerc relied on his fluency in French Sign Language for both teaching and program development—which probably accounts for the considerable similarity between American and French Sign Language signs. (According to recent linguistic analyses, 60% of ASL signs are clearly related to corresponding signs in the French system.) Signs from some of the indigenous sign communication systems that were present in America also contributed to the emerging ASL lexicon. And, inasmuch as ASL is a living language, it continues to add new vocabulary items.

Until recently, linguists did not consider ASL a *true* language. Largely because of the pioneering research of William Stokoe (1919–2000), there has been a dramatic turnaround. Stokoe demonstrated that ASL signs have a distinct linguistic structure. More specifically, he identified three formational aspects that differentiated one ASL sign from another: *handshape* (the configuration and orientation of one or both hands); *location* (where on or near the body the sign is made); and *movement* (changes in hand and arm position needed to form the sign). He also observed that the various sign handshapes, locations, and movements functioned in a manner similar to that of phonemes in spoken languages. Today, most language experts recognize ASL to be a genuine language with a rich vocabulary and a rule-governed grammar.

Unlike many spoken languages that rely on word inflection, intonation, and order to generate variations in meaning, ASL uses changes in sign size, speed, repetition, and spatial location to help convey meaning. With some ASL verbs, for example, the direction of a sign's movement determines who does what to whom and where the action takes place. Signers also take advantage of eye movements, facial expressions, and body postures to transmit meaning. By making optimal use of both gestural and visual modes, ASL signers can communicate complex ideas quickly and with the same precision as those who speak.

ASL also differs from spoken languages in how it is transmitted. For those deaf children with deaf parents, ASL is acquired from their parents in much the same way hearing children learn to speak—through spontaneous communication at home. For the more than 90% of deaf children who have hearing parents, however, language acquisition often takes a different form. Historically, these deaf youngsters typically learned to sign and to refine their sign skills through interaction with ASL-using peers while at residential schools for deaf students. But this process appears to be changing: fewer deaf children today are attending residential schools, and more hearing parents and teachers are learning to sign. Finally, regardless of how it is acquired, it should be evident

that in learning ASL, children are mastering a rich language capable of conveying a wide variety of meanings quickly and accurately.

—John D. Bonvillian

See also Deafness, Language Development

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AMERICANS WITH DISABILITIES ACT

The Americans with Disabilities Act (ADA) was enacted in 1990 and became effective in 1992. Expanding the protection afforded by the Vocational Rehabilitation Act of 1973, the ADA represents the most inclusive and far reaching of the nondiscrimination laws since the landmark Civil Rights Act of 1964. The ADA protects otherwise qualified individuals from discrimination based on their disability and guarantees equal treatment in employment, public services, public accommodations, and telecommunications (Titles I, II, III, and IV respectively), as well as covering miscellaneous issues (Title V) (ADA of 1990, Pub. L. 101–336, 1990).

ADA defines a person with a disability as an individual with (a) a physical or mental impairment that (b) substantially limits one or more major life activities (e.g., seeing, hearing, speaking, walking, breathing, performing manual tasks, learning, caring for oneself, or working), or (c) has a record of such an impairment (e.g., a person recovered from cancer or mental illness), or (d) is regarded as having such an impairment (e.g., severe physical disfigurement) (ADA of 1990, Pub. L. 101–336, Sec. 12102 [2], 1990). Individuals with minor or short-duration conditions are not covered (e.g., broken leg).

EMPLOYMENT

Title I prohibits discrimination against a qualified applicant or employee because of his or her disability in any employment practice or related activity, including recruitment, job application procedures, selection, termination (layoff or firing), promotions, compensation, leaves, training, and other terms, conditions, and privileges of employment. All private employers, state and local governments, employment agencies, and labor unions with 15 or more employees are covered. The ADA does not impose any affirmative action obligations, and employers have the right to hire any qualified candidates.

A key concept in the ADA is that of "otherwise qualified." Otherwise qualified individuals possess the knowledge, skills, abilities, and other characteristics or requirements (e.g., legitimate experience or education) and can perform the essential functions of the job successfully *with or without* a reasonable accommodation. Job modifications (e.g., exchanging job tasks with co-workers, flexible work hours omitting nonessential tasks), environmental changes (e.g., ramps, larger stalls and grab bars in restrooms, automatic door openers, improved lighting), or auxiliary aids (e.g., speakerphones or headsets, adjustable workstations, wrist or arm supports, magnification aids for reading) that allow a qualified applicant or employee with a disability to perform the essential functions of the job and do not create *undue hardship* for the employer are considered *reasonable accommodations.* Reasonable accommodations may involve modifying workplaces, equipment, or jobs; modifying work schedules; providing qualified readers or interpreters; or appropriately modifying examinations, training, or other programs. These accommodations should be evaluated and made on a case-by-case basis. Employers are not expected or required by law to lower employment standards, provide personal-use items (e.g., glasses or hearing aids), or identify individuals to receive accommodations. People with disabilities must self-identify, provide evidence of their disability, request needed accommodations, and flexibly interact with the employer. Undue hardship is also determined on a case-by-case basis and occurs when the requested accommodation involves excessive financial cost or effort that exceeds employer resources.

People with disabilities who feel that they have been discriminated against can seek legal remedies. Like Title VII of the Civil Rights Act, some cases will involve adverse impact or disparate treatment. Additional ADA cases concern the employer's refusal or failure to accommodate. Litigation will determine whether the individual's disability interferes with work efficiency or poses a risk or hazard to others

(e.g., person's disability is an infectious disease) or if an accommodation creates undue hardship for the organization.

PUBLIC SERVICES

Title II protects qualified individuals from discrimination on the basis of disability in services, programs, benefits, or activities of a public entity (e.g., a state, an agency, political subdivision, any commuter authority). Each service, program, or activity must be operated such that it is readily accessible to and usable by individuals with disabilities unless it would result in a fundamental alteration in the nature of a service, program, or activity or an undue financial and administrative burden. Title II also requires the accessibility of new construction and covers the modification of existing buildings when other methods are not effective in achieving accessibility. Public transportation (e.g., buses, subways, trains) is also covered and must be accessible. Exceptions for providing services in situations where safety and health are jeopardized are also included when they are based on objective criteria and not the result of stereotypes or generalizations.

PUBLIC ACCOMMODATIONS

Title III covers private organizations that provide goods, services, and programs. These organizations, including restaurants, hotels, banks, theaters, doctors' offices, pharmacies, retailers, museums, libraries, parks, schools, and day care centers, cannot deny access on the basis of a person's disability and must make facilities accessible. Title III requires all new construction of places of public accommodation be accessible and requires reasonable modifications to existing facilities.

TELECOMMUNICATIONS

Title IV makes available telecommunications (telephone and television) devices and services for hearing- and speech-impaired users. It requires local and long distance telephone carriers to establish relay services for callers with hearing and speech disabilities who use telecommunications devices (e.g., telecommunications devices for the deaf [TDDs] or teletypewriters [TTYs]) or third-party communications assistants. It ensures confidentiality of these transmissions and sets standards for service. Title IV also requires closed captioning of federally funded public service announcements.

MISCELLANEOUS

Title V deals with a wide range of issues, including retaliation, insurance coverage, construction, state immunity, attorney fees, illegal drug use, exclusions from the definition of disability, and instructions to federal agencies (Equal Employment Opportunity Commission [EEOC] and Department of Justice [DOJ]) for enforcement of the statute. The key protection in this provision is the prohibition of (a) coercing or threatening, or (b) retaliating against the disabled or those attempting to aid a disabled person who files a charge or opposes a discriminatory practice under the ADA.

IMPACT

General acceptance of the law and its mandates is reported in all areas. The old adage "the more things change, the more they remain the same" applies to the effectiveness of this act. Although advancements in accessibility to employment, commerce, technology, telecommunications services, housing, and public services, facilities, and programs have been achieved, the vision of full participation has not materialized, and substantial obstacles remain. The EEOC and DOJ, through enforcement efforts, have obtained substantial monetary settlements and nonmonetary benefits (e.g., reasonable accommodation, policy changes, training and education, job referrals, union membership) for individual workers. The National Council on Disability (NCD) details steady improvement in the efficiency and procedural consistency of enforcement activities. However, large differences between disabled and nondisabled populations are reported in employment, graduation rates, income, home ownership, use of computers, access to transportation and Internet, health care, participation in a range of activities including entertainment, socializing, attendance at religious services, and political participation. Clearly, significant advances need to be made to improve the quality of life for more than 54 million Americans living with a disability.

—Carol F. Shoptaugh

See also Special Needs Children

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AMES, LOUISE (1908–1996)

Noted child psychologist Louise Bates Ames, PhD, was instrumental in the field of child and human development. Both her undergraduate (1930) and master's (1933) degrees in psychology were received from the University of Maine. Her doctoral degree in experimental psychology was granted by Yale University in 1936. Working with Arnold Gesell, in her doctoral dissertation, Ames examined the development of creeping and crawling in infants, otherwise known as the development of "prone progression." This, along with her collaboration with Gesell, soon developed into the theme that followed her life's work—the appearance of relatively clear-cut stages of human development that follow each other in a defined and predictable pattern. This work led to numerous honorary degrees and awards. Among them are two doctor of science degrees, awarded in 1957 from the University of Maine and in 1967 from Wheaton College. In 1974, Ames was the recipient of University of Maine's Alumni Career Award, described as the highest and most distinguished alumni award offered by the university.

Upon the completion of her doctoral degree, Ames worked with Gesell in the Yale Child Studies Clinic. In 1950, Ames, Frances L. Ilg, and Janet Learned (Rodell) cofounded the Gesell Institute of Child Development in Gesell's honor to continue his work. There, Ames served as director of research, associate director, and director and following her retirement, as president of the board.

Her publication list (ranging from 1953 to the early 1990s) is extensive. She authored and coauthored many books and articles and appeared on several television and radio shows. Some of her best-known books are also listed as her favorites, including *Don't Push Your Preschooler,* which she coauthored with her daughter, Joan Ames Chase. *He Hit Me First, Your One Year Old,* and *Your Seven Year Old,* coauthored with her granddaughter, Carol Chase Harber, are also among her most popular. In addition to her publications, Ames began a daily newspaper column, "Questions Parents Ask," in 1952 that lasted for 25 years and was carried by 65 newspapers across the country. "We had more papers than Ann Landers when we began. And we started first," she often noted with pride. One year later, she brought her knowledge and expertise about children and parenting to television stations in major cities.

Ames died on October 31, 1996. Her work is carried on today by the Gesell Institute of Human Development in New Haven, Connecticut.

—Beth P. Jacobson

Further Reading and Reference

Gesell Institute of Human Development, http://www.gesellinstitute.org

AMNESIA

Slight lapses in memory, such as forgetting to return a call from a friend or to pick up milk at the grocery store, are normal and to be expected in healthy individuals. Amnesia is *not* a normal lapse of memory; rather, it is memory loss due to brain

damage or psychological trauma. Amnesias caused by surgery, an accident, drugs, or disease are called *organic amnesias.* Organic amnesia can devastate one's ability to learn new information, to remember information from the past, or both. Amnesia differs from dementias (such as Alzheimer's disease), which involve more than simple memory loss. Amnesic patients do *not* have deficits in immediate recall (e.g., repeating a string of numbers immediately after hearing them) and have preserved overall intelligence, whereas patients with dementia exhibit continuous deterioration of memory ability along with other cognitive skills. Further, dementias progress as a result of ongoing neuronal loss, whereas amnesia has an abrupt onset.

Anterograde amnesia refers to the inability to learn and remember new information. It is often seen in individuals who have suffered a stroke, although a wide variety of medical problems that inflict damage on the medial temporal lobe of the brain can cause anterograde amnesia. Usually, these amnesics have difficulty learning all varieties of new information, although it is possible to have problems learning specific varieties of information (e.g., amnesia may be limited to learning spatial locations). The most famous anterograde amnesic is a patient known as H. M., who underwent radical surgery that removed tissue from his medial temporal lobe in order to help control his life-threatening seizures. From the time he awoke following surgery until the present (more than 50 years), H. M. has been unable to learn and remember any new information, including what year it is, where he now lives, and who his caregivers are.

An inability to remember information that was previously known is called *retrograde amnesia.* This can result from damage to the cortex, with the extent of brain damage strongly related to the density of the resulting amnesia. Even in cases of severe retrograde amnesia, there may be "islands" of intact memory for salient events. Generally, retrograde amnesia occurs only for a brief period of time preceding the injury. For example, if a person in a car crash sustains brain damage, he or she might be brought to the hospital unconscious and awaken a few hours later. Although the patient may be able to understand and remember that he or she is now in the hospital, the last thing the patient might remember is leaving the house that morning. Interestingly, most cases of anterograde amnesia are accompanied by some degree of retrograde memory loss, although the severity of the anterograde and retrograde deficits is not always strongly correlated.

Psychological amnesia is sometimes also called functional, psychogenic, traumatic, or dissociative amnesia. Psychological amnesia can result when an individual is under extreme stress or experiences a traumatic event (in the absence of brain injury). The amnesic individual may report lapses in memory for information related to a traumatic or stressful event or period in his or her life. Memory loss can last anywhere from an hour to a period of years. Memories may be recalled after being triggered by stimuli related to the trauma. Psychological amnesia sometimes occurs in individuals involved in combat or victims of childhood abuse. A rare subtype of psychological amnesia is dissociative fugue, in which an individual completely forgets who he or she is and often creates a new identity. Dissociative fugue can last anywhere from a few hours to years, and patients emerging from the fugue state often regain their true identity but have amnesia for events from the fugue period.

—Lori E. James and Paula M. Adkins

See also Long-Term Memory, Short-Term Memory

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AMPHETAMINES

Currently, amphetamines (AMP) and methamphetamines (MA) are among the most widely abused illicit drugs in the world, second only to marijuana. More than 35 million individuals worldwide use and abuse

AMP or MA on a regular basis (as compared with cocaine, which is used by about 15 million people, and heroin, used by fewer than 10 million). As a specific compound in the larger amphetamine family of powerful psychoactive stimulants, MA has become the most popular drug because of its high potency, relative low cost, and ease of manufacture.

Amphetamines were introduced into medical use in the United States in the early 1930s as a nasal spray for the treatment of asthma. By the mid-1960s, the U.S. Food and Drug Administration (FDA) placed the entire class of drugs under regulatory control because of growing concern over its misuse and overuse. Terms to describe the effects of AMP use and users such as "speed freaks" and "speed kills" are an enduring legacy to the phenomena. In the 1970s, regulatory controls on lawfully made AMP were progressively tightened. The Controlled Substances Act, which sorts all regulated substances into one of five schedules based on the substance's medicinal value, harmfulness, and potential for abuse or addiction, includes AMP and MA in Schedule II (Control Level). These drugs are considered to have a high abuse potential with severe psychic or physical dependence liability.

Methamphetamine is known by a large variety of slang names, including "crystal," "meth," or "speed." It can be injected, smoked, snorted, or taken by mouth. The intensity and duration of the "rush" experienced after use is a result of the release of high levels of dopamine into the brain and depends in part on the method of administration. This rush is almost instantaneous when MA is smoked or injected, but takes about 5 minutes after snorting or 20 minutes after oral ingestion. The half-life of MA is 12 hours, giving a duration of effect ranging from 8 to 24 hours (in contrast to the 1-hour half-life of cocaine, giving a high of only 20 to 30 minutes). The use and misuse of MA result from its subjective effects, including euphoria, reduced fatigue, reduced hunger, increased energy, increased sex drive, and increased self-confidence. Although AMP and MA initially produce positive effects, the user is typically unaware of negative consequences to many of the body's systems. Short-term and long-term cardiovascular, respiratory, neurological, cognitive, dermatological, dental, and psychiatric damage may occur in many individuals.

The immediate physiological effects of MA use are like those produced by the fight-or-flight response. As the body prepares for the simulated emergency of the fight-or-flight response, increased blood pressure and heart rate, constricted blood vessels, dilated bronchioles (breathing tubes), and increased blood sugar levels can cause irreversible damage to blood vessels in the brain, producing stroke, respiratory problems, irregular heartbeat, extreme anorexia, cardiovascular collapse, and death. Other negative physical and medical side effects include stomach cramps, shaking, high body temperature, stroke, and cardiac arrhythmia.

Abnormal movements and facial gestures are hallmarks of chronic stimulant abuse, and both acute and chronic use of AMPH and MA may result in coordination problems, shaking, involuntary facial and mouth movements, stereotyped movements, and tics. Abnormal, involuntary movements associated with stimulant use may decrease or end when drug use stops; however, chronic AMP and MA addicts may demonstrate long-lasting movement disorders that may persist for several years after drug withdrawal. Other negative consequences of use include cognitive deficits in memory, attention, concentration, and problem solving. Although some of these deficits may improve over time, enduring deficits may occur in some individuals.

Short-term and long-term AMP or MA use may result in psychological effects such as increased anxiety, insomnia, aggressive tendencies, paranoia, and hallucinations. Of great concern is a psychotic state that may be indistinguishable from paranoid schizophrenia. Paranoid delusions and transient auditory and visual hallucinations are frequent with MA use and its associated psychoses, with as many as two thirds of chronic MA users experiencing delusional psychoses. The delusions may be brief, although it is common for episodes to last several days to months. Of much concern is the violence that often accompanies AMP and MA use, especially in instances of use by parents of young children.

Importantly, the route of administration affects the potential for adverse reactions and associated medical disorders. Intravenous use may result in illnesses associated with the use or sharing of contaminated drug paraphernalia, including human immunodeficiency virus (HIV), hepatitis, tuberculosis, lung infections, pneumonia, bacterial or viral endocarditis, cellulites, wound abscesses, sepsis, thrombosis, renal infarction, and thrombophlebitis. Nasal insufflation (snorting) is associated with sinusitis, loss of sense of smell, congestion, atrophy of nasal mucosa, nosebleeds, perforation or necrosis of the nasal septus, hoarseness, problems with swallowing, throat ailments, and a persistent cough.

Continued use of MA may result in tolerance, and increased use at higher dosage levels may lead to dependence. Investigations of the long-term consequences of MA use in animals indicate that as much as 50% of the dopamine-producing cells in the brain can be damaged even after low levels of MA use, and serotonin-containing nerve cells may be damaged even more extensively. Withdrawal effects from discontinuing use of MA often include depression, irritability, fatigue, anergia, anhedonia, and some types of cognitive impairment that last from 2 days to several months.

—Maureen Hillhouse

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ANDROGYNY

Feminine traits, those characteristically associated with women, include helpfulness to others, gentleness, warmth, and emotionality. Masculine traits, stereotypically associated with men, include assertiveness, self-reliance, achievement orientation, and independence. Traditionally, psychologists viewed femininity and masculinity as opposite roles of a single bipolar continuum: the more feminine a person was, the less masculine that person could be.

In the 1970s, Sandra Bem and other psychologists, such as Janet Spence and her colleagues, began to challenge the bipolarity assumption. They conceptualized femininity and masculinity as two independent dimensions, rather than as one dimension in which masculinity and femininity were mutually exclusive. According to this view, individuals can show any combination of female-stereotypic and male-stereotypic characteristics. A high degree of one does not imply a low degree of the other.

Individuals, female or male, who exhibit high levels of both feminine and masculine personality traits are said to demonstrate *androgyny.* People who have many masculine traits but few feminine ones are termed *masculine;* those with many feminine but few masculine characteristics are labeled *feminine.* Individuals who show few feminine and few masculine traits are designated as *undifferentiated.*

A number of tests have been constructed to measure femininity and masculinity. The two most widely used instruments are the Bem Sex Role Inventory (BSRI), developed by Sandra Bem, and the Personal Attributes Questionnaire (PAQ), developed by Janet Taylor Spence and her colleagues. These instruments, both published in 1974, ask participants to indicate the extent to which various personality traits apply to them. The traits used in these tests are virtually all positive. Each of these tests yields both a femininity score and a masculinity score.

Bem has hypothesized that androgynous individuals are more flexible and adaptable than others, able and willing to engage in either feminine or masculine behaviors as the situation requires. For example, the androgynous woman or man could successfully close a tough business deal at work and also be a nurturing spouse and parent at home. Furthermore, because androgynous individuals can summon a wider range of behaviors to meet the challenges of life, they should enjoy advantages in mental health and psychological adjustment.

There is a good deal of evidence that androgynous children, adolescents, and adults are better adjusted than are masculine, feminine, or undifferentiated peers. For example, androgynous adolescents, compared with other adolescents, have better social relations and greater self-esteem, and they are more likely to have resolved identity crises.

Some research, however, has found little or no difference between androgynous and masculine individuals. Several studies, for example, have found that androgynous and masculine individuals are equally high in self-esteem. Apparently, it is high masculinity and not the specific combination of high masculinity and high femininity that is strongly related to well-being and self-esteem. What might account for the positive relationship between masculinity and psychological adjustment? One possible reason is that masculine characteristics have broader adaptive significance

for an individual than do feminine characteristics. Another related hypothesis is that masculine traits are more highly valued in Western society than are feminine traits. Thus, people with masculine traits may feel more positive about their ability to function effectively.

The contribution of femininity to overall adjustment is less clear than that of masculinity. Femininity appears to have little or no effect on the adjustment of women. However, highly feminine men appear more poorly adjusted than highly masculine men. This may result from the greater cultural pressure placed on men than women to conform to their socially expected role. A more recent notion about the contributions of femininity and masculinity to adjustment is the differentiated androgyny model. According to this view, the context of the situation or behavior is critical in determining the relative importance of femininity and masculinity to an individual's self-esteem. For example, high femininity can be an asset to both women and men in social interactions and in some occupations such as nursing and special education.

The past three decades have witnessed major changes in the incidence of masculinity and androgyny among college students. During the 1970s, female college students were more likely than their male peers to score high on femininity, and males were more likely to get high scores on masculinity. About one third of females and males were rated androgynous. In recent years, there has been a noticeable increase in masculinity and androgyny among women and a slight increase among men. Moreover, women and men no longer differ on several traits previously classified as masculine, such as being assertive, ambitious, active, independent, or self-reliant; defending one's beliefs; and acting as a leader. These changes most likely are a result of societal shifts in women's roles and status in the past few decades. Opportunities for girls to develop masculine-typed traits have expanded significantly in the spheres of sports, education, and employment. Although women have been encouraged to become agentic, men have not been as encouraged to become communal. Such findings bring into question the validity of the masculine and feminine dimensions of instruments such as the BSRI and PAQ, which were developed 30 years ago. We also cannot assume that findings based on undergraduate college students are generalizable to other segments of society.

When the psychological measurement of androgyny was introduced in the 1970s, it was received enthusiastically by feminist scholars. It replaced the notion that psychological health required that females be feminine and that males be masculine. By embodying socially desirable traits for both females and males, androgyny seemed to imply the absence of gender stereotyping. Moreover, by incorporating both feminine and masculine behaviors, androgyny appeared to broaden the scope of behaviors that can be used to handle different situations and thus lead to more flexible and adaptive behaviors.

Although androgyny continues to be viewed by feminist scholars as more positive than restrictions to either femininity or masculinity, several criticisms have been leveled against this concept. One criticism is that the instruments used are too narrow to be considered comprehensive measures of femininity and masculinity. For example, some researchers note that only socially desirable agentic and communal traits are measured. Others have noted that the concepts of femininity and masculinity may mean different things to women and men. In addition, white and African American women do not define femininity in the same way. Thus, instruments such as the BSRI and PAQ, at best, measure only one component of whatever ways masculinity and femininity are defined in different populations.

Another criticism is that the notion of androgyny, similar to the bipolar differentiation of femininity and masculinity, is based on the division of gender into female-stereotypic and male-stereotypic characteristics. Rather than making traits gender neutral, androgyny involves the combination of gender-specific orientations. Some theorists have suggested that androgyny should be viewed as a transcendence of gender roles, rather than emphasizing some balance between feminine and masculine traits.

An additional concern is that androgyny might be erecting unrealistic goals for individuals by requiring that people be competent in both the communal and agentic domains. In a sense, such expectations restrict, rather than expand, the range and flexibility of individuals' behavioral choices.

A further criticism of androgyny is that the concept does not deal with masculinity and femininity in their unequal cultural context. It neither acknowledges nor attempts to eliminate the greater cultural value placed on male activities. A related concern is that androgyny will not lead to the elimination of gender inequality, a goal that requires societal rather than personal change. That is, the mere existence of individuals with both

feminine and masculine traits does not alter the patriarchal power structure in society.

—Claire Etaugh

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ANEMIA

Anemia is a condition in which the oxygen-carrying capacity of the red blood cells is reduced. The red blood cells, or erythrocytes, contain molecules called *hemoglobin* that bind oxygen. Oxygen is picked up from the lungs on the hemoglobin molecules and transported through the blood throughout the body to tissues as required.

There are many causes of anemia. Anemia may result from deficiencies of substances needed to produce red blood cells: iron, vitamin B_{12} (cobalamin), or folate (folic acid). Those at risk have inadequate dietary intake or absorption of these substances or increased requirements. Iron deficiency is the most common cause of anemia. According to one national survey, 3% to 5% of females between 16 and 49 years of age and 3% of children between 1 and 2 years of age have anemia due to iron deficiency. Iron requirements increase during rapid periods of growth in young children and adolescence and during pregnancy. In addition, dietary iron ingestion may not be enough to counter blood loss in menstruating women. Strict vegetarians are at risk for developing iron and vitamin B_{12} deficiencies, whereas folate deficiency is more common among alcoholics and others with poor diets. Folate is destroyed by heat, putting those who eat primarily overcooked or canned foods at risk for deficiency. In addition to poor intake, some individuals may be unable to absorb iron, vitamin B_{12}, or folate because of specific disorders (e.g., pernicious anemia, sprue) or prior gastrointestinal surgeries (e.g., gastrectomy). Some medications can impair the body's ability to use folate properly. Blood loss or destruction of red blood cells within the body due to exposure to specific toxins (e.g., naphthalene in mothballs, fava beans) may also cause anemia. Anemia is also associated with chronic infections and diseases such as renal failure, cancer, and arthritis.

There are many symptoms of anemia, but most are vague. Patients with anemia may complain of fatigue, coldness, weakness, dizziness, or sore tongues. Pale skin and fingernail beds may be noted. In more pronounced anemic states, the heart rate may be increased and chest pain or shortness of breath may be reported. Infants and young children with anemia are at risk for developmental delays and behavioral disturbances. In addition, patients with vitamin B_{12} or folate deficiency anemia may have neurological symptoms such as irritability, changes in memory, and tingling or numbness of the extremities.

The diagnosis of anemia is dependent on documentation of low hemoglobin and hematocrit levels in the blood. The normal values are higher in adult men than in adult women and also change from infancy through childhood. Other laboratory abnormalities depend on the cause of the anemia itself. For example, the mean corpuscular volume (MCV), the size of the red blood cell, will be low if the anemia is due to iron deficiency, but high if due to vitamin B_{12} or folate deficiency. A careful dietary and medical history should be accompanied by measurement of serum iron, vitamin B_{12}, and folate concentrations to establish the cause of the anemia.

The treatment of the anemia is dictated by the cause. Patients with iron deficiency are commonly give a several-month course of ferrous sulfate or other

iron salt until hemoglobin levels return to normal and iron stores are repleted. Vitamin B_{12} is available as oral tablets and may also be given as monthly intramuscular injections for those with medical conditions that affect absorption. Folate is generally given orally once daily. Patients with acute blood loss or dramatically low hemoglobin levels may also be given blood transfusions to correct the anemia immediately. Treatment of underlying causes (e.g., cancer, chronic infections) will also improve anemia. Patients with anemia due to kidney disease often receive injections of drugs that increase the production of red blood cells by the bone marrow. The development of anemia may be prevented by the use of folate, vitamin B_{12}, and iron supplements in pregnant women and others at risk for deficiency.

—Janice L. Stumpf

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ANGER

Emotions are often written all over children's faces. They are unique qualities that develop over time, distinguish each individual child from others, and significantly influence our personalities over the course of our life spans. Anger is one of the most talked about yet least understood emotion. It has been an important field of study in many disciplines. Anger is a powerful emotion, and rational solving can quickly give way to emotional and reflexive reactions. Parents, educators, and counselors spend a great deal of time helping children learn how to deal with anger and aggression because problems arising from such behavior account for most referrals to mental health services. The cost borne by educational, health, criminal justice, and mental health systems that deal with youngsters and adults who are aggressive and have conduct problems are staggering, making aggression and antisocial behavior the most costly mental health problem in North America.

WHAT IS ANGER?

Anger is the internal experience of a private, subjective event (i.e., emotion) that has cognitive (e.g., thoughts, self-statements, private speech, attributions) and physiological (e.g., shifts in heart rate, muscle tension) components. *Aggression,* which may be verbal (e.g., taunting, threatening, name calling) or physical (e.g., hitting, fighting), involves behavioral acts that inflict bodily or mental harm on others. Aggressive behavior may be proactive (threatening, bullying) or reactive (retaliatory). Aggression causes less serious harm than *violence,* wherein the aggressive acts cause serious harm (e.g., aggravated assault, rape, robbery, homicide).

THEORIES OF ANGER AND AGGRESSION

Given that anger and aggressive behavior are frequent among children, it is logical to ask why children behave this way. What causes a child to hit another, to verbally abuse another, or to shove another child aside to take a toy? Over the years, several theories of aggression have been proposed. Some suggest that to behave aggressively is an instinct, part and parcel of the human condition. For instance, Freud's psychoanalytical theory suggests that we all have a death drive that leads us to act aggressively toward others as we turn our inward hostility outward. Ethologists contend that a fighting instinct, stemming from primitive urges to preserve territory, maintain a steady supply of food, and weed out weaker animals, is innately imbedded in our makeup. Sociobiologists often take an evolutionary point of view in considering the biological roots of social behavior by arguing that aggression facilitates the goal of strengthening the species and its gene pool as a whole, according to the "survival of the fittest" doctrine. Male testosterone and other biological factors may underlie aggressive behavior and, in part,

explain why males are more likely aggressive than females. Such instinctual explanations, however, fail to account for the increasingly sophisticated cognitive ability that humans develop as they grow older and fail in determining when and how individuals will behave aggressively. Social learning theories have emphasized how social and environmental conditions teach individuals to behave aggressively. Cognitive approaches suggest that the key element in understanding anger is to examine one's interpretations of other's behavior and of the environmental context in which the behavior occurs. For example, developmental psychologists note that some children are more prone to assume actions are aggressively motivated, have difficulties in paying attention to the appropriate cues in a situation, and are unable to interpret the behaviors in a given situation accurately. Instead, they assume, often erroneously, that what is happening is related to other's hostility. They become physiologically aroused and subsequently experience anger. In deciding how to respond, they base their behavior on inaccurate interpretations of other's behavior and behave aggressively in response to a situation that may never, in fact, have existed. Aggressive individuals are often more impulsive and deficient in problem-solving capabilities. Thus, angry and aggressive children and adults manifest a developmental lag and deficits in specific social-cognitive and affect-labeling processes. Environmental theories contend that family forces can foster high levels of aggression in children and involve inconsistent parental discipline, rejection of the child, harsh punishment, and lack of supervision.

DEVELOPMENTAL PROGRESSION OF ANGER AND AGGRESSION

As children grow and learn, they exhibit anger and aggression in generally consistent stages. Beginning shortly after birth, if not before, a child's individuality is manifested primarily in temperament, which is the groundwork for the early-emerging, stable individuality in a person's behavior. *Temperament* has been viewed as constitutionally based individual differences in behavioral characteristics that are relatively consistent across situations and over time—dominant mood, adaptability, activity level, persistence, and threshold for distress. These constitute the foundations of personality growth and are closely related to emotions that shape our experience with the world and exercise a pervasive influence throughout the life span. Emotional experience changes considerably with development and involves complex feelings that far surpass the range of temperamental variability. In infancy, the extremes of emotional arousal from intense anger or crying to exuberant delight may oftentimes appear unregulated by the child and uncontrollable. Between the ages of 2½ and 5, temper tantrums appear, often when children are frustrated, are told "no," or do not get their way. Preschoolers commonly struggle over toys and control of space. In fact, oppositional, defiant, aggressive behaviors are so common in preschoolers that it takes a very high level or severity of such things to be considered pathological. As verbal skills improve, however, there is a shift from more overt physical aggression toward greater use of verbal aggression. As this trend continues in middle childhood, aggression occurs mostly during social play. *Instrumental aggression* appears as a way or an instrument to reach goals. *Hostile aggression,* action intended to hurt another person, increases during early childhood and then declines. After the age of 6 or 7, most children become less aggressive as they become more cooperative, less egocentric, and more empathetic. They can understand another person's perspective and begin to understand more positive ways of dealing with others. They become more reflective and strategic about their emotional lives and can be managed better through cognitive means as well as behavioral strategies.

However, some children do not learn to regulate their anger and become increasingly destructive and interact with others in an angry, threatening fashion. Such aggression not only is a reaction to problems in a child's life but also causes major problems by making other children and adults dislike a child. *Relational aggression* (e.g., ostracizing, verbal insults, gossiping) emerges as a way of psychologically harming others. When angry, such behavior is more likely exhibited by girls because boys remain more confrontational in interpersonal interactions. At every age, however, boys show more aggression, assertiveness, and dominance. In adolescence, emotional swings appear to reemerge; adolescents are acutely sensitive to emotion in themselves and peers. There appear to be two unique pathways in the development of aggression and related equivalent problems over the life span. Some children, in life-course-persistent (LCP) path, display aggressive behavior at an early age and continue to do so into adulthood. The adolescent-limited (AL) path involves youths whose aggressive,

antisocial behavior begins at about puberty and continues into adolescence but then drops off in their early to middle 20s. Children with severe anger and conduct problems often do not "grow out of it" but experience difficulties as adults and have problems with the law, related psychiatric problems, employment difficulties, and poor parenting of their own children.

Overall, emotional development continues into adulthood because adults often seek to create personal lifestyles that are emotionally satisfying, predictable, and manageable through various activities. Thus, learning to deal with anger is an important task of early childhood but, for some, is never really mastered and continues to adversely affect their development.

TREATMENT OF ANGER AND AGGRESSION

Treatments must be sensitive to where a child is in this developmental trajectory. More specifically, methods and goals need to differ not only for preschoolers, school-age children, and adolescents but also according to the type and severity of the individual's acting out problems. In general, the further along a child is in the progression of aggressive, antisocial behavior, the greater is the need for intensive interventions. Three treatment approaches with proven success have included parent management training, cognitive-behavioral problem-solving skills, and multisystemic treatment. Parent management training teaches parents to change their child's behavior at home by changing the way they interact with their children. Cognitive-behavioral problem-solving skills training focuses on the cognitive deficiencies and distortions displayed by children and adolescents with anger problems; they are taught to be better problem solvers in dealing with life's frustrating situations. Multisystemic treatment is a family systems approach that emphasizes interacting social influences and views children with aggressive conduct problems as reflecting dysfunctional family relations. In striving to empower caregivers, it views the child with such problems as functioning within a network of social systems, including the family, school, neighborhood, and court and juvenile services.

SUMMARY

Anger is one of the basic emotions in the human experience. It is an internal subjective reaction to external problems or "triggers" and is influenced by cognitive and physiological components. Aggression involves behavioral acts that can take several forms—instrumental (way to reach goals), hostile (inflicting bodily or mental harm on others), or relational (gossiping, ostracizing). Although children and adolescents learn to regulate their anger as they develop, some continue to manifest significant social-cognitive deficits in managing such emotions. During childhood, aggressive behavior and related conduct problems are about 3 to 4 times more common in boys than girls, although this difference decreases by middle adolescence, mainly owing to an increase in covert antisocial behavior in girls. There is a general progression of antisocial behavior from difficult early temperament and hyperactivity, to oppositional and aggressive behavior, to social difficulties, to school problems, to delinquent behavior in adolescents, to criminal behavior in adulthood.

Future research directions need to further elucidate developmental factors in anger and aggression. Various personal characteristics and environmental conditions that either place individuals at risk for problematic aggressive behavior or protect them from the effects of risk need to be further identified. Finally, intervention programs need to be evaluated to establish better "best practices" procedures.

—W. Michael Nelson III

See also Aggression

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ANOREXIA NERVOSA

Anorexia nervosa (AN) is characterized by a severe disturbance in eating behavior as well as an underlying psychological profile that is as important to the disorder as the disturbed eating behavior. Individuals with AN are underweight yet fear gaining weight and also exhibit disturbances in the perception of the shape and size of their bodies. In addition, they exhibit psychological characteristics such as identity disturbance, perfectionism, and low self-esteem despite their often exceptionally high levels of performance in various spheres. A variety of physical, psychological, and psychosocial complications can arise as a result of this disorder. Several treatment options are available to individuals with AN, including interpersonal, cognitive-behavioral, group, and family therapies, as well as pharmacological treatments.

CHARACTERISTICS AND SYMPTOMS

In order to be diagnosed with AN, individuals must exhibit each of the following:

- Severely reduced weight (e.g., weight less than 85% of expected weight for age and height)
- Intense fears of gaining weight
- Disturbed experience of body weight or shape, or denial of the seriousness of the current low body weight
- For women, the absence of at least three menstrual cycles (amenorrhea)

There are two subtypes of AN: binge-eating and purging type, and restricting type. Individuals with AN binge-eating and purging type regularly engage in binge-eating or purging behavior. In contrast, individuals with AN restricting type do not regularly engage in binge-eating or purging behavior. Binge-eating involves feeling out of control while eating a large amount of food in a discrete period of time, and purging behavior includes self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

PHYSICAL AND MEDICAL COMPLICATIONS

Many of the physical and medical complications associated with AN arise as a result of the semistarvation state that characterizes this disorder. These complications include emaciation, cold intolerance, osteoporosis, anemia, low blood pressure (hypotension), slow heart rate (bradycardia), and the development of a fine, downy body hair (lanugo). Erosion of dental enamel and other dental problems may also occur in individuals who use vomiting as a means of weight control.

PSYCHOLOGICAL CONSEQUENCES

Many individuals with AN exhibit depressed mood, social withdrawal, insomnia, and other depressive symptoms. These symptoms may be the result of being in a semistarvation state; hence, mood disturbances may disappear after weight gain, although those that were present before weight loss often persist. Obsessive thoughts and compulsive behaviors concerning food are common and also may be associated with a lack of proper nutrition (although obsessive-compulsive features unrelated to food, body shape, or weight also may occur).

Irritability, loss of sexual libido, and reduced concentration are other features that may occur in individuals with AN. These psychological consequences, in addition to the physical and medical complications associated with AN, negatively affect the quality of life of individuals with AN.

PREVALENCE

For females, the lifetime prevalence of AN is about 0.5%. AN occurs about 10 times more frequently in females than in males. The onset of AN typically occurs during middle to late adolescence (14 to 18 years). AN seems to be more prevalent in industrialized societies in which food is abundant, including the United States, Canada, Europe, Australia, Japan, and South Africa. The incidence of AN has increased over the past several decades; however, it is not clear whether this merely reflects an increased awareness of AN or whether the true incidence of this disorder is increasing.

DEVELOPMENT OF ANOREXIA NERVOSA

A biopsychosocial perspective has been employed to describe the factors that may contribute to the development of AN. This perspective implicates cultural, familial, biological, social, cognitive, and other factors in the development and maintenance of AN. These factors are outlined below.

Sociocultural Factors

The idealization of thinness that exists in Western society is thought to contribute to the development of AN. The "thin ideal" tends to exist in cultures in which there is an abundance of food. Furthermore, the idealization of thinness is targeted more at females than males.

Familial Influences

Compared with the families of individuals with no eating disorders, the families of anorexic individuals are more rigid in their organization and typically avoid discussing disagreements between parents and children. However, it could be that these factors are a consequence of having a family member with AN, rather than a cause of the disorder itself.

There is also evidence that suggests eating disorders occur more often among the first-degree relatives of individuals with AN, as compared with the relatives of individuals without eating disorders. This may reflect genetic or environmental transmission of AN.

Individual Risk Factors

Personality and Trait Characteristics

Individuals with AN tend to be perfectionistic and have low self-esteem. Hilde Bruch, an influential contributor to the literature on etiology and psychotherapy for AN, suggested that individuals with AN are struggling for autonomy, control, and self-respect and that the changes in eating behaviors that occur with AN represent attempts to overcome this struggle. The use of weight and shape as a means of self-evaluation, identity formation, and control appears to be a key factor in the development and maintenance of AN.

Body Dissatisfaction

Body dissatisfaction in and of itself is unlikely to lead to the development of AN. However, if an individual with high body dissatisfaction seizes upon weight and shape as a means of self-control, extreme dieting behaviors may ensue, which in turn may contribute to the development of AN in susceptible individuals (who also have the personality and familial risk factors).

Biological Factors

Neuroendocrine functioning is altered in individuals with AN. Serotonin imbalance has been implicated as a cause of AN, although it remains unclear whether this imbalance is present before the development of AN, or whether it may be a consequence of the disorder.

Adverse Events

Negative interpersonal experiences, including trauma and abuse, have also been implicated in the development of AN. It may be that individuals who experience these stressful life events develop AN as a coping mechanism in order to attempt to regain emotional control and overcome identity problems.

TREATMENT

People with AN often fail to recognize or admit that they are ill. As a result, they may resist treatment. Many individuals with AN present for treatment in order to satisfy their loved ones who pressure them to seek treatment out of concern. Once in treatment, AN patients may fail to comply with treatment requirements and may be uncooperative with clinicians.

Because of the complexity and severity of the disorder, individuals with AN require a comprehensive treatment plan, including medical care, psychosocial interventions, nutritional counseling, and, when indicated, medication management. When a clinician diagnoses an individual with AN, the clinician must determine whether the person is in immediate physical danger and thus requires hospitalization. Treatment of AN typically involves three main components: (1) restoring weight to a minimally healthy level; (2) treating psychological disturbances such as body shape or weight distortion, low self-esteem, and interpersonal conflicts; and (3) relapse prevention (maintaining treatment gains).

Hospitalization

Patients with AN may require hospitalization for the purpose of medical management or active treatment

of the eating disorder. Severity of weight loss is the major criterion used to indicate that admission is required. When weight is at or below 75% of what is expected for the person's age and height, hospitalization is usually recommended. Inpatient programs typically involve several elements, including nutritional and medical rehabilitation and psychotherapy. Patients are encouraged or required to eat regular meals. In addition to these meals, patients may be required to take nutritional supplements. There is considerable controversy as to the appropriateness of feeding patients against their wishes. Admissions for involuntary feeding are considered to be an emergency measure. Patients admitted under these circumstances are not considered to be actively pursuing treatment. AN patients may also receive individual or group therapy addressing their psychological disturbances. Inpatients with AN progress to outpatient treatment when it is considered safe for them to do so.

Psychotherapy

Unfortunately, limited psychotherapy outcome data exist for the treatment of AN. The data that are available fail to indicate which type of treatment is best. However, several types of psychotherapy are available:

- Cognitive-behavioral therapy includes behavioral elements (including the normalization of eating) with a focus on identifying and altering dysfunctional thought patterns, attitudes, and beliefs, which may trigger and perpetuate restrictive eating and binge-eating and purging behavior. Self-monitoring of food intake and symptoms is also important, as is identifying triggers and developing alternative reactions to them.

- Interpersonal psychotherapy focuses on relationship difficulties, self-esteem, assertiveness, social skills, and coping strategies.

- There is no one unified form of family therapy. The goal of family therapy is to help members of the family change behaviors that may have contributed to the development and maintenance of the eating disorder.

- Group psychotherapy can be very helpful because it provides people with AN with the opportunity to share their experiences and to give feedback to each other, and it may enhance self-esteem through helping others. Groups are usually led by one or two facilitators.

Medication

No specific medications have been shown to treat AN effectively. However, some medications may be helpful in speeding up recovery or in treating associated problems such as anxiety and depression. Antidepressant medications may help in reducing depressive feelings, as well as controlling obsessive thoughts about food and weight.

Course and Prognosis

The mortality rate among people with AN is estimated at 0.59% per year, which is about three times higher than for other psychiatric illness. The most common causes of death are complications of the disorder, such as cardiac arrest or electrolyte imbalance, and suicide. The course and outcome of AN vary. Of those individuals who survive, about 46% fully recover, 33% experience some improvement, and 20% remain chronically ill. A number of individuals with AN later develop other eating disorders, particularly bulimia nervosa. One study found that 16.8% of AN patients went on to meet diagnostic criteria for bulimia over the course of a 6-year follow-up period.

—Jennifer S. Coelho, Kathryn Trottier, and Janet Polivy

See also Bulimia Nervosa, Eating Disorders

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ANTI-SEMITISM

Anti-Semitism, or prejudice against the Jews or Jewish culture, has plagued the world for almost 2,000 years. The Jews were scapegoats first in the ancient and medieval Christian world and then in the modern world. Anti-Semitism is one of the greatest examples throughout the course of human history of man's inhumanity to his fellow man.

The history of the Jews has been marked with triumph, but also great tragedy. Nearly 2,000 years ago in ancient Rome, the Jews were forcibly expelled from their homeland, and the diaspora took them to various parts of the Middle East, North Africa, and Europe. The birth of anti-Semitism can be traced directly to Christian anti-Jewish attitudes. The early Christians were frustrated that the Jews did not convert to the new religion, and the anti-Jewish hostility can be found in the New Testament in the Gospel of John and letters of Paul. Many Christians believed that Jews were responsible for the death of Jesus of Nazareth, and the term "Christ-killer" was applied to the Jews throughout the Middle Ages.

From the 4th century onward, Christians shunned the Jews and forced them to live in ghettos. Jews had to wear distinct medieval costumes and in many parts of Europe a yellow badge to signify that they were Jewish and to warn the Gentile population. As the centuries progressed, the animosity that Christianity had toward its sister religion gradually escalated into homicide. In 1095, Christians slaughtered hundreds of thousands of Jews and Muslims during the Crusades. In 1347, the Black Death swept across Europe, taking the lives of nearly half of the population. Christians eventually accused the Jews of poisoning the wells, thereby bringing about the plague. The Christians slaughtered thousands of Jews in retaliation. The violence continued in the 15th century as Europeans accused Jews of ritually murdering Christian children. The blood libel myth lasted until well into the 20th century and led to extraordinary violence against the Jews. Anti-Semitism continued in the late 1400s in the aftermath of the Spanish Inquisition as hundreds of thousands of Jews were expelled from Spain in 1492. The Protestant Reformation of the 16th century offered a glimmer of hope for the Jews as the religion of Christianity effectively divided in half between Roman Catholicism and Protestantism. The Jews of Europe anticipated tolerance from the Protestants, but unfortunately that was not to be, as Martin Luther penned the most anti-Semitic document ever written in 1543 entitled, "On the Jews and their Lies." The relationship between Jews and Christians remained tense for centuries to follow.

At the start of the modern era, Jews residing in Western Europe had reason for optimism. In the mid-18th century, the enlightened despot Frederick the Great allowed for some Jews to live outside of the restrictive ghettos in historic Prussia. The movement toward emancipation continued in the early 20th century as Napoleon Bonaparte destroyed the remaining ghettos in Western Europe. Jewish Emancipation appeared to be a distinct possibility but unfortunately failed to materialize as a new form of anti-Semitism developed focusing on Jewish control of the economic and social aspects of European life. In the capitalist nations of Western Europe, Jews proved to be a convenient scapegoat for all the shortcomings of European society. As nationalism increased in Western Europe, so too did anti-Semitism. Germany was the birthplace of modern anti-Semitism, as pseudoscientists like Wilhelm Marr, Georg von Schonerer, and Herman Ahlwardt and the composer Richard Wagner blamed the Jews for all of Germany's problems. France also experienced a rise in anti-Semitism in the late 19th century. Edouard Drumont's anti-Jewish newspaper, *La Libre Parole,* experienced widespread circulation. In the late 1890s, the nation was bitterly divided during the Dreyfus Affair, a scandal that centered on a Jewish captain in the French Army who was accused of selling military secrets to the Germans. Captain Dreyfus was innocent but was convicted solely on the fact that he was Jewish.

In 19th century Eastern Europe, the Jews faced an even more dangerous situation. The Czarist Government of Russia forced the Jews to live in the Pale Settlement, and the Jewish population was subject to frequent attack. By the 1880s, homicidal anti-Semitic attacks were so frequent that a new word, *pogrom,* was ushered into the Russian vocabulary. In 1881, Alexander III became the new czar of Russia and immediately adopted measures to keep Jews from owning land.

He also slashed Jewish university enrollment by 90%. The May Laws of 1882 placed further restrictions on the Jews, stripping them of the most fundamental of human rights. Because of these harsh restrictions, many Russian Jews left the nation permanently, settling in Western Europe, South Africa, and the United States. Pogroms intensified in Russia over the next 25 years as Russian mobs slaughtered thousands of Jews and destroyed or confiscated large amounts of Jewish property in the Pale Settlement. Not only did massive Jewish emigration occur in late 19th-century Russia, the Jews also began to search for a Jewish nation in what was more commonly known as *Zionism.*

Zionism had its origins in the Pale Settlement in Russia in the 1880s and was a direct response to European anti-Semitism. The objective was to establish a Jewish state somewhere in the world as a way to provide a safe haven for the Jews. In 1896, Theodor Herzl took control of the Zionist movement. Herzl was born in Vienna, Austria, and was raised in a fully assimilated Jewish family. After witnessing the anti-Semitism of the Dreyfus Affair, the journalist Herzl became an avowed Zionist. In the Zionist Congresses in Switzerland, Jewish delegates discussed various locations for a Jewish nation, including Argentina, Uganda, and Palestine. Unfortunately, a Jewish state did not come into existence by the early 20th century, and the movement suffered another setback with the untimely death of Herzl in 1904.

As the early 20th century progressed, many Jews attempted to leave the European continent and settle in Palestine or the United States. By 1930, the Jewish population in the United States was the largest in the world. Although anti-Semitism in America paled in comparison to Europe, it was nevertheless prominent in the 1920s and 1930s. Before the Great Migration (1881–1921), anti-Semitism in America was virtually nonexistent. However, as large numbers of Russian Jews began arriving in the United States in the late 19th century, American public opinion pressured Congress to restrict the numbers of Jews and other undesirables entering the nation. Congress responded by effectively sealing the nation's borders in 1924. The United States had been a Protestant nation for Protestant people, and now Americans faced a sizable Jewish population and a large Catholic population. The Ku Klux Klan experienced resurgence in the 1920s in response to these unwanted newcomers. African Americans, Jews, and Catholics were all targets of the Klan as membership in the organization soared. Universities across the nation imposed a quota system to limit the amount of Jews who could enroll in medical, law, or graduate school. Many Americans considered Jews to be communists or subversive elements who could inflict considerable harm on the nation. The automobile manufacturer Henry Ford reprinted the Protocols of the Elders of Zion in his newspaper, *The Dearborn Independent.* The Protocols, a proven forgery by 1921, alleged an international Jewish conspiracy that sought to control the world. Anti-Semitism reached its apex in the United States in the 1930s during the Great Depression. A Roman Catholic priest, Fr. Charles Coughlan, led his own crusade against Jewish Americans, despite the fact that his own Detroit parish had been victimized by frequent cross burnings of the Ku Klux Klan. The "radio priest," as he was called, railed against the evils of New Deal legislation and Jewish influence in the nation. Charles Lindbergh, a Nazi apologist and sympathizer, also espoused anti-Semitic remarks at various rallies in the United States throughout the late 1930s and early 1940s. Anti-Semitism was a significant problem in the United States in the first half of the 20th century, but it never reached the levels of Europe. In the second half of the 20th century, anti-Semitic attitudes in the United States began a steady decline.

In the aftermath of World War I, many Germans blamed the Jews for Germany's defeat in the war. More than 400 anti-Semitic organizations formed in Germany in the 1920s, despite the fact that the Jews amounted to less than 1% of the population. The Nazi Party, one of the more prominent of the new German political parties, tied together extreme nationalism and anti-Semitism. Adolf Hitler, the leader of the Nazi Party, accused the Jews of stabbing Germany in the back and conspiring to ruin the nation. When Hitler became Chancellor in 1933, he put his German nation on the road to genocide. Anti-Semitism reached its most horrific chapter during the holocaust as a supposedly civilized and cultured nation participated or stood idly by as nearly 6 million European Jews were murdered through systematic execution and starvation. The holocaust took the lives of nearly 70% of the Jewish population in Europe and more than 50% of the Jewish population in the world.

In 1948, the nation of Israel came into existence, fulfilling the Zionist dream of the 19th century.

Anti-Semitism, while declining slightly in Europe, increased significantly in the Middle East in the second half of the 20th century. Although the nation of Israel was established, a Palestinian state failed to materialize. The violence between Jews and Arabs was all too predictable. The Arab-Israeli conflict is still unresolved in the present day, and there is little reason for optimism in the near future.

Anti-Semitism has affected the world for almost 2000 years. The irrational hatred of the Jewish people stands as testimony to the dangers of intolerance. For as the great holocaust historian Raul Hilberg warns, "as long as a group of people are not fully assimilated into a society they walk a tightrope between acceptance and annihilation."

—Timothy Crain

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ANTISOCIAL BEHAVIOR

DEFINITION

The term *antisocial behavior* was originally defined as recurring violations of socially prescribed norms across a range of contexts (e.g., school, home, and community). Antisocial behaviors include verbal and physical aggression toward others, disregard for authority figures, readiness to break rules, and a breach of society's social norms and mores. In the school setting, antisocial behaviors are manifested in the form of noncompliance, defiance, bullying, truancy, stealing, aggression, and eventually, school dropout. Aggression—physical, verbal, and gestural—is the hallmark characteristic of antisocial behavior. Although aggression provides these youngsters with short-term rewards, aggressive behavior is aversive to others and leads to rejection. By definition, antisocial is the opposite of prosocial, which is characterized by positive, cooperative social interaction patterns.

Researchers and practitioners often conceptualize problem behaviors as being either externalizing or internalizing problems. Externalizing behaviors refer to behavior problems that are outer directed or undercontrolled (e.g., aggression and disruption.). In contrast, internalizing behaviors refer to behavior problems that are inner directed or overcontrolled (e.g., somatic complaints, anxiety, and depression). Antisocial behavior can be viewed as a subclass of externalizing behaviors and the foundation for conduct disorder (CD), a psychiatric diagnosis. This is particularly disturbing given that conduct disorder is viewed as a chronic, lifelong condition that is often not responsive to adult-controlled tactics and is very resistant to intervention efforts.

Antisocial behavior, which is viewed as a precursor to delinquency and criminality, is an all too common form of psychopathology among today's youth. It is the most frequently cited reason children are referred for mental health services. In fact, almost half of all referrals are due to antisocial behaviors. Without intervention, students with antisocial behavior are at risk for a host of short-term and long-term negative consequences.

COMORBIDITY

Comorbidity refers to the co-occurrence of disorders. Comorbidity is a concern given that having more than one disorder may produce a highly negative "multiplier effect." Youths with antisocial behavior are often comorbid with learning disabilities, depression, and hyperactivity. Youngsters with antisocial behaviors often have learning disabilities and academic underachievement in general. Some evidence suggests that these academic deficits actually broaden over time, whereas other evidence suggests that the deficits maintain over time. Youths with antisocial behavior and depression are also at heightened risk for pejorative outcomes such as suicide. The combination of antisocial behavior and problems of hyperactivity-impulsivity-inattention (HIA) also leads to heightened risk for destructive outcomes (e.g., impaired relationships with teachers and peers, academic failure) as well as the clinical diagnosis of conduct disorders. Some suggest that the co-occurrence of conduct problems and HIA is a precursor to criminality and other serious forms of psychopathology.

Unfortunately, high-risk populations are often vulnerable to multiple-risk disorders, having a strong negative impact on their development. Consequently, it is important that screening and assessment procedures attend to multiple problems and disorders evidenced by this population. It is particularly important to address aggression early on because aggression is highly stable over time, with the consequences of aggression increasing in magnitude as children develop.

IMPACT ON CHILDREN AND FAMILIES

Antisocial behaviors can be devastating to the individual, the family, the school, and the community as a whole. Antisocial behavior can occur either early in a child's development or later during adolescence. Outcomes are much worse for those youth with early-onset antisocial behavior. Antisocial behavior evident early in a child's educational career is actually the single best predictor of delinquency during adolescence. In fact, 70% of youths with antisocial behavior have been arrested at least once within 3 years of leaving school.

Antisocial behavior is believed to be developmentally salient by age 3 or 4 and is relatively stable by age 8. Researchers have suggested that after age 8, antisocial behavior and conduct disorders should be viewed as chronic lifelong disorders, such as diabetes. In other words, the disorder can be managed, but there is no cure. This is not to suggest that it becomes "too late" to intervene, just that the intervention shifts from prevention to remediation.

As previously mentioned, the stability of antisocial behavior over a 10-year period is about equal to the stability of intelligence, with the correlation for IQ approximating 0.70 and the correlation for aggression approximating 0.80. In general, the more severe the antisocial behavior pattern, the more stable the behavior over time and across settings (e.g., home, school, and community). These youngsters are at severe risk for a host of aversive short-term and long-term negative consequences ranging from school failure, school dropout, impaired social relationships, substance abuse, employment problems, higher rates of motor vehicle crashes, higher rates of hospitalization, and higher mortality rates.

Given that children and youth with antisocial behavior patterns become less amenable to intervention efforts over time, it is important that early detection and intervention techniques be employed to divert these youngsters from going down this destructive path.

INTERVENTIONS

The research community is in agreement that the best way to intervene with antisocial behavior is to identify these youth as early as possible and then provide interventions that encompasses (a) parents and the home setting, (b) teachers and the classroom setting, and (c) peers and the playground setting.

A single intervention program is rarely sufficient to address the multiple challenges of antisocial behavior. Antisocial behavior represents a wide array of behaviors that differ in onset, etiology, risk factors, and clinical course. Dimensions within a behavior can vary in frequency, intensity, repetitiveness, and chronicity. Despite the challenges of addressing antisocial behavior, many evidence-based interventions have proved effective in decreasing antisocial behavior in children.

Family-focused interventions that have proved effective in decreasing antisocial behavior in children are family therapy and parent management training. Both interventions focus on the family unit to increase positive communication skills, structure within the home, problem solving, and social-learning techniques.

Classroom interventions are often child centered and require commitment from the school as well as the classroom teacher. Behavior therapy and problem-solving skills training have met with demonstrated success in decreasing antisocial behavior patterns in children. Behavior therapy focuses on learning new positive behaviors that will replace the antisocial behaviors. Problem-solving skills training focuses on improving cognitive processes and problem-solving skills that underlie social behavior.

Another intervention approach that is useful in developing prosocial behavior and connections with peers is community-wide intervention. This intervention type focuses on activities that promote prosocial behavior that is incompatible with antisocial behavior.

Other intervention efforts, such as individual psychotherapy, group therapy, pharmacotherapy, and residential treatments, have been attempted to prevent the development of antisocial behavior. Individual psychotherapy and group therapy have not produced strong effects. Pharmacotherapy and residential treatments are usually reserved for the more severe antisocial behaviors. Pharmacotherapy is designed to affect the biological systems that research findings have

correlated to aggressive and emotional behaviors. Although residential treatments have yielded behavior changes, these changes typically do not sustain when children are reintegrated into their school and home settings.

As mentioned earlier, the focus of intervention efforts employed vary according to the age of the child. For example, interventions for children in preschool through grade 3 focus on prevention strategies such as social skills instruction (designed to improve teacher-, peer-, and self-related forms of adjustment), academic instruction, family support, and early screening and identification. Interventions used for children in grades 4 through 6 focus on remediation, such as social skills training, study skills to improve academic performance and competence, and family support. Interventions used for children in grades 7 and 8 focus on amelioration, such as self-control, academic skills, prevocational skills, and family support. Finally, interventions used at the high school level (grades 9 through 12) include survival skills, vocational skills, transition to work, and coping skills.

In general, interventions should focus on achieving school success, gaining acceptance from teachers and peers, staying in school as long as possible, and going on to lead a productive life. These can be best accomplished by teaching replacement adaptive behavior patterns. Factors that increase positive outcomes of interventions include the comprehensiveness, intensity, length, and fidelity of the intervention.

Schools that have demonstrated effectiveness in preventing antisocial behavior problems have many common characteristics. They ensure the principal's support, provide high-quality staff training, supervise prevention activities, use structured materials and programs, integrate programs into normal school operations, embed programs in a school planning activity, and create structures and systems to promote the use of best practices and implement them with high degrees of fidelity.

With sustained commitment to school-wide reform and institutional commitment to empower staff, students, and parents, children with antisocial behavior patterns are likely to improve and become productive members of society.

—Kathleen Lynne Lane and M. Annette Little

See also Social Development

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ANXIETY DISORDERS

Anxiety is a common experience to all, including children and youth. Although many people may consider anxiety to be a negative experience associated with stress or problems, it can serve a positive function by alerting one to imminent threats or danger. Anxiety is also a marker for typical developmental patterns and can serve as an indicator that social and emotional development is progressing as expected. The first major developmental signs of anxiety occur at about 6 to 7 months of age, when the infant becomes distressed about the presence of unfamiliar people. This pattern is known as *stranger anxiety* and indicates that the child is now beginning to differentiate people in the environment, which is a cognitive skill. These reactions usually subside by about 12 months of age. At about 12 to 15 months of age, toddlers may demonstrate signs of *separation anxiety* and become upset when a familiar caretaker, most often the parent, leaves them with someone else. They may cry, cling, and plead for the parent not to leave. This pattern also indicates that the child is progressing cognitively and is beginning to understand that parents can leave and express fear that they might not return. These behaviors usually resolve by about 2 years of age, and although the child may prefer the presence of parents, he or she is able to separate from them and

Table 1 Major Signs of Anxiety

Cognitive	*Behavioral*	*Physiological*
• Concentration problems	• Motor restlessness	• Tics
• Memory problems	• "Fidgety"	• Recurrent, localized pain
• Attention problems	• Task avoidance	• Rapid heart rate
• Oversensitivity	• Rapid speech	• Flushing of the skin
• Problem solving	• Erratic behavior	• Perspiration
• Worry	• Irritability	• Headaches
• Cognitive dysfunctions	• Withdrawal	• Muscle tension
–Distortions	• Perfectionism	• Sleeping problems
–Deficiencies	• Lack of participation	• Nausea
• Attributional style problems	• Failing to complete tasks	• Vomiting
	• Seeking easy tasks	• Enuresis

enjoy being with others. These patterns are normal and should not cause undue concern, unless they are severe, protracted, or occur at ages not expected of the child. For example, it is common for children to have some separation anxiety when starting school, but it usually resolves quickly and does not remain a problem.

SIGNS OF ANXIETY

Anxiety may be shown in several behaviors, which can be cognitive, behavioral, or physiological in nature. Cognitive signs include difficulties with memory and concentration, whereas behavioral manifestations include rapid speech and sleeping problems. Physiological responses include excessive perspiration and rapid heart rate. Table 1 summarizes the major signs of anxiety.

The central cognitive characteristic of anxiety is *worry,* which is apprehension about an anticipated real or imagined event or threat over which the person feels to have inadequate control. Worry has a predictable developmental pattern that corresponds with levels of cognitive development. Being able to worry requires that the child be able to anticipate a future event or outcome. At preschool and young childhood levels, children have difficulty thinking about more than one future event at a time and anticipating outcomes. At elementary ages, children increase their ability to consider multiple possibilities and outcomes, increasing their proneness to anxiety. Adolescents and adults develop abstraction skills and hypothetical-deductive reasoning ability and can think about their own thinking. Although these skills may be helpful, they may also provide a basis for being able to anticipate several outcomes over which little control is perceived, which may contribute to the development of anxiety that interferes with functioning. The specific conditions that create anxiety are not well understood, but the ability to anticipate even one negative event may cause anxious reactions. In particular, high levels of anxiety can interfere with problem solving by causing impairments in perceiving all possible solutions, selecting a solution, or applying a selected option.

Excessive worry does not have to have a basis in reality, but if a child *perceives* a situation to be threatening, anxiety can result. I once worked with a young boy whose parents were flying out of state for a short time while he stayed with grandparents. He was extremely fearful that the plane was going to crash and that they would be killed. Although acknowledging that the likelihood of such a catastrophe occurring was very small, he could not resolve the fear that it might happen. To him, the fear, however irrational and unlikely, was extremely worrisome and interfered with his daily behavior.

TRAIT AND STATE ANXIETY

Anxiety that is chronic and is seen as a typical personality or behavioral characteristic is termed *trait anxiety.* This type of anxiety is most commonly associated with anxiety disorders and is manifested across a range of situations. *State anxiety* is experienced in specific situations, such as when taking tests or public speaking. Although there is not necessarily a high

correspondence between trait and state anxiety, people with high trait anxiety are more prone to state anxiety and to experience performance problems.

ANXIETY DISORDERS

When anxiety is extremely high in frequency, duration, or intensity, an *anxiety disorder* may occur. Anxiety problems that warrant intervention occur in up to 15% of the population. The estimated prevalence rate of anxiety disorders in children and adolescents is about 2.5% to 5.0%. These disorders often are not detected because children with anxiety disorders often are not disruptive or do not call attention to themselves. As a way to cope with anxiety, children often withdraw from anxiety-producing situations, and they may appear to be uninterested or unmotivated. Some anxious types of behavior often are seen in children with attention deficit hyperactivity disorder, which may make it difficult to differentiate the two conditions. Anxiety disorders also co-occur with depression in about 50% of cases, although anxiety is associated with positive affect, whereas depression is associated with negative affect. When anxiety and depression disorders coexist, the anxiety disorder most likely preceded the depressive disorder. Girls tend to report anxiety symptoms more often than boys, although the difference may be due, in part, to boys' reluctance to report them. Up to about 10 or 11 years of age, there are few meaningful differences between the genders, although boys' anxiety seems to dissipate faster. Consequently, girls and women are more likely to be given diagnoses of an anxiety disorder.

The only anxiety disorder specifically associated with children, *separation anxiety disorder* (SAD) is characterized by developmentally inappropriate difficulties with separation from adults, usually parents. The reasons for SAD can be complicated and cannot be covered here. Otherwise, children may have the same types of anxiety disorders as adults, including generalized anxiety disorder, posttraumatic stress disorder, and obsessive-compulsive disorder.

CAUSES OF ANXIETY DISORDERS

The causes for anxiety disorders can be based in either biological or environmental factors. Although environmental factors may contribute to the development and maintenance of anxiety symptoms, there is ample evidence to suggest that children with anxiety disorders may be biologically predisposed to anxiety. These children often are described as fearful, cautious, perfectionistic, apprehensive, "high strung," or having social difficulties. Evidence also suggests that some children may have a pattern termed *behavioral inhibition,* which appears to be a biologically based pattern associated with being fearful, less sociable, and easily distressed and having low attention shifting and high levels of negative affect (distress, fear, inhibition). These children appear more likely to develop anxiety disorders.

Children and adolescents who are exposed to chronic stressful and unpredictable circumstances that are not resolved easily may be at greater risk for developing anxiety disorders. Parenting practices also may contribute to anxiety disorders. For example, some research suggests that parents who are overprotective may encourage and reinforce avoidant and inhibited behavior in their children. New situations remain new to the child, leading to impaired ability to cope and perceptions that the environment is negative.

INTERVENTIONS FOR ANXIETY DISORDERS

Interventions for anxiety disorders in children and youth often are complex and require multifaceted approaches, including working with the family. It is beyond the scope of this entry to give details about interventions, but there are some methods that have shown evidence of effectiveness in treating anxiety disorders. With proper intervention methods, most anxiety disorders can be successfully treated. It is not usually realistic to expect that all anxiety will be removed; rather, the goal should be to reduce it to a manageable level.

Cognitive-Behavioral Interventions

These methods emphasize changing distorted or deficient beliefs that contribute to the development and maintenance of anxiety. The most effective methods include multiple sessions of instruction, practice in learning and applying new skills, and homework assignments.

Behavioral Interventions

These methods include systematic desensitization, muscle relaxation training, self-reinforcement, self-management, and positive reinforcement techniques.

Counseling Interventions

Although these types of interventions may not be as effective in treating specific anxiety symptoms, they may be helpful in learning needed adaptive and social skills.

Family Interventions

Because anxiety often is associated with family and parenting issues for children and youth, family-based counseling and parent training may be indicated to alter dysfunctional parent–child–family interactions.

—Thomas J. Huberty

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APGAR SCORE

For more than 50 years, the Apgar scoring system has been used universally in the delivery room to assess the overall health and integrity of the newborn immediately after birth. A score of 0 to 2 is assigned in each of five areas at 1 and 5 minutes after birth. If prolonged resuscitation is needed, scoring continues at 5-minute intervals until the infant is stabilized. The five areas are **A**ctivity—from no movement (0) to tone, movement, and flexion (2); **P**ulse—from absent (0) to more than 100 beats per minute (2); **G**rimace—from no reflex irritability (0) to cough or pulling away (2); **A**ppearance—from blue-gray color (0) to normal (2); and **R**espiration—from absent (0) to regular with crying (2). A change in the score from 1 to 5 minutes reflects the effectiveness of the resuscitation, and thus the 5-minute score is considered a better predictor of survival in infancy than the 1-minute score. A 5-minute score of 7 to 10 is normal. A score of 4 to 7 signals a need for resuscitation. A score of 3 or below signals the need for intense, and sometimes prolonged, resuscitation. A low score (less than 3) of long duration (greater than 10 minutes) may correlate with future neurological dysfunction.

The Apgar was intended to be a means of rapidly evaluating the clinical condition of the infant at birth, not a marker of asphyxia or a predictor of neurological outcome. Although the former remains a valid use of the Apgar, the latter must be qualified. Many factors, including premature birth, prenatal factors, infection, maternal anesthesia, and congenital malformations, may affect the Apgar score. Thus, a low Apgar score alone cannot be interpreted as evidence of asphyxia. Additional criteria must be met. In 2001, the *New England Journal of Medicine* published the findings of a retrospective cohort analysis of 151,891 live-born singleton infants delivered at 26 weeks' gestation or later, which concluded that the 5-minute Apgar score continues to be a valid predictor of neonatal *survival* in large populations, but is not predictive of long-term neurological outcomes. This conclusion held true for both prematurely born and full-term infants. Also published in 2001 were the findings of a large cohort study in Norway, which found that a 5-minute Apgar score of 3 or less was associated with a significantly increased risk for subsequent death or cerebral palsy. In 2003, the American Academy of Pediatrics/American College of Obstetricians and Gynecologists (AAP/ACOG) joint task force, in reviewing all the recent study data, continued to affirm the findings of their 1996 joint statement. The task force concluded that the 5-minute Apgar score continues to be a valid predictor of survival and that an Apgar score of 0 to 3 after 5 minutes is an appropriate criterion to use as potentially marking intrapartum asphyxia. The risk for poor neurological outcome increases when the Apgar score remains less than 4 at 10, 15, and 20 minutes.

—Joanne Bregman

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Virginia Apgar, http://www.apgar.net/virginia

APGAR, VIRGINIA (1909–1974)

At a young age, Virginia Apgar, born in Westfield, New Jersey, decided upon medicine for her future career. Apgar majored in zoology, chemistry, and physiology

and graduated with a bachelor's degree from Mount Holyoke College in Massachusetts in 1929. She then entered the College of Physicians and Surgeons at Columbia University and completed her degree in medicine in 1933. Upon graduation, Apgar was selected for a surgical internship at Columbia University, an extraordinary accomplishment for a woman at that time. Her supervisor, the chairman of surgery, Dr. Alan Whipple, encouraged her to study anesthesiology. In 1937, Apgar became the first female board-certified anesthesiologist. In 1949, she was the first woman to be appointed Full Professor in Anesthesiology at Columbia University.

Later that year, Apgar began her specialty in obstetric anesthesia. Emerging concerns regarding immediate newborn assessment challenged Apgar. In an attempt to address this issue, Apgar developed what is now world renown and known as the *Apgar score.* The Apgar score is a simple five-point observation scale that nurses and physicians can use immediately after delivery to assess infants for potential problems. The Apgar score was published in 1953 and has become the international standard for assessment of newly born infants.

In 1959, Apgar left Columbia to attend the John Hopkins University School of Public Health. There she studied statistics as well as public health. Upon completion of a master's degree, Apgar was appointed Director of the National Foundation–March of Dimes (now the March of Dimes Birth Defects Foundation) to assist in promoting public awareness in birth defects. Between 1967 and 1972, Apgar continued as Director of Basic Research of the National March of Dimes Birth Defects Foundation. In addition to many scholarly publications, Apgar coauthored the book, *Is My Baby All Right?* in 1972 with Joan Beck, which dealt with identification of birth defects.

—Rosemary C. White-Traut

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APNEA

Apnea is a brief pause in one's breathing pattern. When it occurs for extended periods or frequently during sleep, it may be a cause for concern. Pauses of 20 seconds five or more times per hour in adults indicate the presence of sleep apnea syndrome, whereas the syndrome is diagnosed when pauses of 10 seconds one or more times per hour occur in children 1 to 12 years of age.

There are three types of apnea: obstructive, central, and mixed. Obstructive sleep apnea (OSA) is the most common type of apnea in both children and adults. Estimates of OSA in children range from 1% to 10%. Most have mild symptoms, and many outgrow the condition. Caused by an obstruction of the airway, childhood OSA is associated with enlarged tonsils and adenoids. Problems related to allergies, neuromuscular disease, and craniofacial abnormalities also may be involved. Although obesity is the most common cause of OSA in adults, it is not as frequently associated with childhood OSA. The most common symptom is snoring, although not all children who snore have OSA. Other symptoms are labored breathing while sleeping, gasping for air, sleeping in unusual positions, bedwetting, and changes in color.

Central apnea occurs when the part of the brain that controls breathing does not start or maintain the breathing process properly. This form is very rare in older children and adults. In very premature infants, it is common because the respiratory center in the brain is immature. Even with premature infants, a few short central apneas are normal. Only when these pauses are frequent or prolonged do they become cause for concern.

Mixed apnea is a combination of central and obstructive apnea. It usually begins with a central episode followed by collapse of the muscles in the throat. This obstruction causes the child to struggle to resume breathing

Treatment for OSA related to enlarged tonsils and adenoids involves surgical removal. Facial reconstructive surgery is required for the small number of patients with craniofacial abnormalities. Weight loss is indicated for overweight children. For those whose conditions do not indicate the above approaches, a continuous positive airway pressure (CPAP) device, used to keep the airway opened, is recommended. Treatment for central or mixed apnea involves the use of a bilevel positive airway pressure device (Bi-PAP). With the Bi-PAP device, the pressure varies during each breath cycle. If the user does not breathe independently, the machine will initiate a breath.

Although children often outgrow mild forms of sleep apnea, particularly central sleep apnea, OSA has serious consequences for development. Infants and

children with OSA are more likely to have elevated diastolic blood pressure, abnormal cardiac function, and decreased muscle tone than are those with no sleep disorders. They are also more likely to be diagnosed with the general condition of failure to thrive. Infants with sleep disorders have reduced levels of alertness, intensity, and activity as well as deficits in reflexes, motor movements, motor symmetry, visual and auditory functioning, balance, and tactile functioning. This suggests that neurological problems may be associated with sleep disorders. Perhaps because of the sleep deprivation associated with all forms of apnea, school-age children with OSA have poor attention spans, intermittent hyperactivity, sleep "spells," and overall decreases in academic performance. Children with mild hyperactivity behaviors are more likely to have sleep disorders than those with significant symptoms of attention deficit hyperactivity disorder (ADHD), suggesting that some behaviors that result from apnea and other sleep disorders are misattributed.

Current medical thinking suggests that the damage from lack of oxygen that occurs with OSA may be permanent. In addition, apnea of childhood and infancy may progress at faster rates than for adults. Thus, the early and accurate diagnosis and treatment of this disorder are imperative in order to prevent possible extensive and permanent developmental impairments.

—Virginia Norris

See also Sleep

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APPLIED BEHAVIOR ANALYSIS

Applied behavior analysis is the scientific study of behaviors of social importance. Established principles of behavior, described in large part by B. F. Skinner through his meticulous empirical investigations with nonhuman animals, are applied to the improvement of behaviors about which people in our society care. Applied behavior analysis attempts to understand behavior through precise and reliable measurement of interactions between individuals' behavior and their environment, while isolating the conditions that create important behavior change.

Unlike approaches in psychology that rely on behavior to provide information regarding hypothetical entities (e.g., a young boy's aggression is an indicator of low self-esteem or a faulty information-processing system), in applied behavior analysis, behavior itself is the subject matter of interest. Contrary to popular belief, applied behavior analysis does not restrict the variables that influence behavior to those found in the environment outside the skin. Applied behavior analysis acknowledges the influence of genetics and other biological variables and recognizes that biological research contributes to a broader understanding of behavior. In addition, applied behavior analysts consider private events, that is, those events that can be observed by only one person (e.g., somatosensory stimuli), to be real events that can influence behavior. Nevertheless, most applied behavior analysis researchers have looked where the light is good—the environment outside the skin—for variables responsible for changes in behavior, both public and private (e.g., thinking), primarily because these variables lend themselves to objective measurement and manipulation given the current state of technology.

HOW IS APPLIED BEHAVIOR ANALYSIS RELEVANT TO CHILD DEVELOPMENT?

Because of its ability to describe, predict, and improve important behavior, applied behavior analysis represents a particularly practical approach to understanding children's development. In psychology, development is typically characterized as orderly changes across time. In contrast, Sidney W. Bijou and Donald M. Baer, who contributed greatly to the behavior-analytic approach to development, defined *development* as progressive changes in interactions between the behavior of individuals and events in their environments. Their use of the term *progressive* emphasizes not that development necessarily advances in a linear fashion, but instead that development depends on earlier conditions. This definition shifts the emphasis from a search for time-related variables (e.g., ages and stages) to the behavior-environment processes that produce behavior change.

Much of what is known about child development is collected through normative studies in which population samples are surveyed to determine the most likely age at which a particular skill can be reliably observed (e.g., children learn to walk when they are about 1 year old). These data are essential in determining typical and atypical development. Applied behavior analysis goes beyond this focus on when a particular behavior occurs during one's lifetime, to analyze why and how particular behaviors emerge. In this way, once atypical development is identified, a behavioral analysis will attempt to identify the conditions that will remediate the developmental trajectories of children. In other words, applied behavior analysis attempts to identify and describe the specific learning history and present environmental variables that combine to give rise to specific important behaviors, such as walking, eating with utensils, talking, problem solving, and caring for others in distress.

Many developmental psychologists imbue specific behaviors with great importance because they mark the point of some other, more important change for the individual, such as the passage to a more advanced stage (see the work of Jean Piaget). An applied behavior analysis of development and more traditional approaches to development agree that development is not linear, but instead is punctuated with qualitative changes in behavior. Traditional developmental psychologists often consider these changes to be caused by the emergence of an internal hypothetical structure (a walking or problem-solving schema) or that the behavior (e.g., understanding that fluids in tall and wide containers may have the same volume) is a product of a particular stage (e.g., period of concrete operations). The applied behavior analysis approach considers the stages to be descriptive, in that they too need to be explained. Therefore, qualitative changes in the rate and form of development are considered to be a product of necessary physical conditions, the child's history of interactions with the environment, and present circumstances.

In summary, an applied behavior analysis approach to development shifts the emphasis from the importance of behavioral topography (what a behavior looks like) and when particular topographies of behavior emerge as a means to infer changes in some hypothetical constructs, to behavioral function, which entails identifying the specific preconditions for the emergence of a behavior. Before describing some of the contributions made by an applied behavior analysis approach to development, a brief review of the applied behavior analysis conceptual system is necessary.

DESCRIBING AND UNDERSTANDING BEHAVIOR

Principles of behavior are derived from experimental analyses of the behavior of human and nonhuman animals. This literature suggests the existence of two main types of behavior—respondents and operants. Respondents, also known as *reflexes,* were initially described by the Russian scientist Ivan Pavlov in his now famous experiments in which dogs reliably salivated at the sound of a bell owing to the dog's earlier history in which food was presented with the sound of a bell. Respondents are automatic, involuntary, and typically physiological responses (blinking, changes in heart rate) that are a function of preceding environmental events (e.g., loud noise). Contrary to the popular belief that behavior analysis is a stimulus-response (S-R) psychology, applied behavior analysis does not consider all behavior to be respondent or mechanically elicited from environmental events. In fact, respondents make up a small proportion of the behaviors that are the subject matter in applied behavior analysis.

Operants are the important behaviors of everyday life. They are generally what we do—walking, eating, socializing, working, playing—or say. They are the primary behaviors of interest in applied behavior

analysis. Operants are not defined by what they look like (saying, "Excuse me," raising a hand in class, making eye contact, or yelling across a noisy room); they are defined by their common consequences (attention). The effects or consequences of an operant on the environment are responsible for determining the future probability of that behavior. In other words, operants, unlike respondents, are thought to be sensitive to their consequences. If a behavior results in a change that is an improvement for the individual, then that behavior will be more likely to occur in the future. This is the process of *reinforcement.* An infant's raising and moving her arm is reinforced by music and the mobile's movement, if under similar conditions, these behaviors occur again. By contrast, if a behavior results in a change that is worse for the individual, then that type of behavior will be less likely to occur. This is the process of *punishment.* Operant behavior and its associated consequences also occur in a context, and therefore, events that precede operant behavior come to influence its occurrence through their association with its consequences. For instance, a child may learn that crying will only result in a bottle when her mother, but not when her brother, is present. Behavior occurring in a context makes up what is known as a *contingency.* An analysis of a behavior involves identifying relevant aspects of a contingency—what are the momentary conditions that make the reinforcer valuable (referred to as *establishing operations*) and clearly available (referred to as *discriminative stimuli*), and what are the consequences that either maintain (reinforcers) or suppress (punishers) important behaviors?

APPLIED BEHAVIOR ANALYTIC CONTRIBUTIONS TO CHILD DEVELOPMENT

Understanding child development entails careful observation and description of important behavior in relevant environments in order to discover the necessary and sufficient learning histories that give rise to important behaviors. These "functional analyses" have been used to understand how children develop motor, language, and social skills, as well as problem-solving and moral behaviors. The behavior-analytic conceptual system and the concept of reinforcement in particular were invoked by Donald M. Baer to explain the qualitative changes in behavior described in many normative developmental studies. He described how, at various points in time, children learn particularly important behaviors, referred to as *behavioral cusps,* which bring the child in contact with a variety of reinforcers for new behavior. An example of a behavioral cusp is learning to walk, which permits the toddler to see and touch (and taste!) things that were previously inaccessible. This, in turn, leads to improved play, greater social interactions, and so on.

Understanding the conditions under which important behaviors emerge has contributed to the conceptualization of child development, but perhaps more important, it has allowed for applied behavior analysts to solve a wide range of problems for children with learning and developmental disabilities. Behavior analysts have developed highly effective interventions for severe problem behaviors exhibited by children diagnosed with autism or other developmental disabilities, childhood eating disorders, and mental illnesses such as depression. From preschool classrooms to middle school, from language to leisure skills, and from community involvement to quality of life, behavior analysts continue to explore, attempt to understand, and enhance development in a variety of socially important arenas.

—Gregory P. Hanley

See also Skinner, B. F.; Theories of Development

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APTITUDE

Aptitude is a very complex term with different meanings and uses. According to *Merriam-Webster's*

Collegiate Dictionary (2003), aptitude can be defined as (1) an inclination, tendency, or a natural ability; (2) a capacity for learning; and (3) general suitability. The most common definition of aptitude involves an innate ability to perform an activity or task. It is, in essence, the predisposition we all come into the world with to do well in certain areas and maybe not so well in others. This ability supersedes environmental variables and "nurture"; we are born with a certain aptitude for particular domains, such as music, drawing, language, and so forth. Aptitude refers to a generalized ability to learn; the environment may contribute to us being able to manifest this ability but is not responsible for instilling it, if it was not present at birth.

Over the years, there has been much confusion surrounding the terms aptitude, achievement, and intelligence. These constructs are closely related, and often they have mistakenly been used interchangeably, especially in the educational setting. It thus becomes important to understand how these constructs differ. After many transitions throughout the history of psychological assessment, intelligence tests now assess generalized ability, learning that occurs in a wide variety of settings, and acquired experiences (e.g., verbal reasoning skills, spatial perceptual abilities, memory); achievement tests, such as reading and mathematics tests, seek to measure the specific learning that has already taken place in school or at home; and aptitude tests attempt to measure the individual's capacity to be successful at a particular task (e.g., the Scholastic Aptitude Test attempts to measure how well an individual would perform in a higher education setting).

How do we measure aptitude, given that it is such a general and broad term? Aptitude tests are structured, systematic ways of evaluating how people perform tasks or react in different situations. They are characterized by standardized methods of administration and scoring, with the results quantified and compared with how others have done at the same tests (norms). Furthermore, aptitude tests are administered under timed conditions.

Aptitude assessment is widely used in career counseling because the process seeks to help the individual identify particular professional areas in which they might be successful. For example, the individual might take a variety of tests measuring different areas of ability and skill in order to identify those skills and abilities that not only are of interest but also are relatively well developed. Following the results, the individual then may choose a particular career more closely affiliated with her or his identified strengths. Scores can be used in a variety of ways. In the employment arena, a perspective employer might have determined a particular score that must be achieved in order for the prospective employee to be considered for employment or for advancement.

Often, under the auspices of aptitude assessment, individuals may be administered Personality Questionnaires that may be used to ascertain reaction to particular situations, such as measuring the attitudes of an individual. Generally, these questionnaires are not timed, nor do they have right or wrong answers. As mentioned earlier, more traditional aptitude tests are typically designed to assess an individual's ability to learn the skills necessary to succeed in a particular endeavor.

In conclusion, aptitude can be thought of as natural talents, special abilities, or the capacity to learn—traits that are considered highly stable over a long period of time. Currently, aptitude tests are used to determine how successful an individual will be at a particular task or which areas of strength exist within the individual's skill set that might be helpful in making career or other decisions. Accurate development of a genuine understanding of one's aptitude is a critical step that may well lead to more lifelong satisfaction.

—Natalie N. Politikos

See also Aptitude Tests

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APTITUDE TESTS

Aptitude tests are standardized instruments assessing specific cognitive, perceptual, or physical skills. These tests are frequently used in industry to inform decisions about hiring, placement, and advancement. In addition, aptitude tests are used in selection procedures for college, professional programs, and career

planning. Aptitude tests are also useful for program evaluation and answering research questions based on scientific inquiry. In most cases, aptitude tests are administered in group format.

Although there may be some overlap in skills assessed, aptitude tests differ from intelligence tests primarily in their purpose and scope. Whereas intelligence tests assess global ability, aptitude tests target a specific domain or set of domains. In fact, aptitude tests were originally derived from subcomponents of intelligence tests. The development of aptitude tests corresponds with the discovery of a statistical technique called *factor analysis.* Using factor analysis, relationships among various items are revealed. These interrelationships are grouped together to create a test assessing specific skills or abilities.

Hugo Munsterberg and Walter Dill Scott were two of the earliest contributors to the creation of modern-day aptitude testing. Before World War I, Munsterberg's research resulted in the prototype for career-based aptitude tests described in his industrial psychology textbook, *Psychology and Industrial Efficiency* (1913). Scott's 1915 landmark article, "The Scientific Selection of Salesmen," called for the use of aptitude tests to identify the most highly qualified personnel. In 1928, Clark Hull published *Aptitude Testing,* in which he advocated for a more objective approach to vocational guidance.

Both World Wars I and II sparked an increased interest in developing tools for applied work in psychology. In particular, the Army's need for an efficient method of selecting individuals for a range of task-specific jobs spurred the development of the Army Alpha and Beta tests to aid in decisions about military placements. The Army Alpha was administered in written form, and the Army Beta used a nonverbal format. The results of these tests were used to determine suitability for specific work (i.e., artillery, flight engineer, navigator, or potential leader). Also during this time, consulting firms began to specialize in publishing tests to aid in industry. In addition to World Wars I and II, other momentous events in the United States stimulated the advancement of aptitude test development. For instance, attention to fairness in employment practices was heightened by the passage of Title VII of the 1964 Civil Rights Act. The passage of Title VII led to practices in aptitude test construction and use that minimized test bias. However, debates about the fairness of using aptitude tests to make employment and admission decisions about minority groups continue.

The Differential Aptitude Test (DAT), a popular multiple-aptitude battery to guide vocational and academic planning, consists of eight independent tests addressing several areas of aptitude, such as verbal reasoning, perceptual speed and accuracy, and language usage. The General Aptitude Test battery (GATB), developed by the U.S. Department of Labor, is another multiple-aptitude battery and includes 12 tests predicting training success in cognitive, perceptual, and psychomotor skills of high school seniors and adults for different levels of job complexity. Although these aptitude batteries are useful in predicting scholastic aptitude, they are less useful in predicting specific technical abilities. Aptitude tests such as the Seashore Tests of Musical Aptitude, the Modern Language Aptitude Test, and the Bennett Mechanical Comprehension Test measure specific sets of skills and are often part of selection or admission procedures. In addition, the Armed Services Vocational Battery (ASVAB) screens potential recruits and assigns personnel to different jobs and training programs. Consisting of 10 subtests, it is the most widely used pencil-and-paper test in existence. Other aptitude batteries, such as the Scholastic Assessment Test and the American College Test, serve as entrance criteria into college, universities, and professional training programs.

—Michelle R. Haney

See also Aptitude

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ARTERIOSCLEROSIS

Arteriosclerosis is the scientific term used to describe what is commonly referred to as "hardening of the arteries." The process most often responsible for this transformation is atherosclerosis, arterial hardening due to the deposition of fat, calcium, cellular debris, and other substances within the arterial

wall. Because of its greater specificity, the term *atherosclerosis* will be used here. The importance of atherosclerosis lies in the fact that it is the process responsible for most forms of cardiovascular disease, the leading cause of death in the United States and many other Western nations. About 60% of all deaths in the United States are completely or partially attributable to underlying cardiovascular disease. Thus, the process of atherosclerosis has important implications for the individual as well as society at large.

Atherosclerosis is a progressive process that has been shown to begin in childhood. The disease is characterized by changes within the arterial wall in the space just beneath the innermost layer of the vessel. Fats migrate into this space, where they are chemically modified; this triggers an accelerating cascade of biochemical events that causes an influx of inflammatory cells, dysfunction of the cells lining the blood vessel, and remodeling of the vessel wall with the deposition of calcium and other substances. The end result is the formation of an atherosclerotic plaque.

As the plaque grows, it impinges on the arterial lumen, thereby reducing blood flow. When the tissue downstream from the lesion becomes sufficiently starved of oxygen and other nutrients, the patient begins to experience symptoms. Initially, this manifests as pain when the oxygen and nutrient demands of the tissue are greatest, that is, during exercise. Decreased blood flow through peripheral arteries causes attacks of lameness and pain in the legs with walking, whereas reduced perfusion of the heart presents as chest pain that radiates to the left arm and shoulder (angina pectoris). By inducing aberrant behavior among the cells that form the inner lining of the artery, atherosclerotic plaques also predispose the vessel to sudden occlusion by promoting the formation of blood clots. Clots formed in an artery supplying the heart result in a heart attack, whereas clot formation in a vessel feeding the brain manifests as a stroke.

Several atherosclerosis risk factors have been identified, including high concentrations of low-density lipoprotein cholesterol ("bad cholesterol"), low concentrations of high-density lipoprotein cholesterol ("good cholesterol"), smoking, high blood pressure, ovarian dysfunction, and diabetes. Some psychosocial factors have also been shown to correlate with the development of atherosclerosis. These include depression, anxiety, personality and character traits (e.g., competitiveness, anger, and hostility), social isolation and lack of social support, and acute and chronic life stresses. In contrast, submissiveness appears to be protective. It has been proposed that these psychosocial factors affect the development of atherosclerosis through their effects on behaviors (smoking, diet, compliance with therapeutic regimens) as well as by directly modifying the biochemical cascade responsible for the disease. The ultimate development of atherosclerosis is likely the result of several risk factors working in concert through multiple mechanisms.

Treatment of atherosclerosis focuses on risk factor modification. This includes smoking cessation, control of blood sugar for patients with diabetes, blood pressure control, and modification of cholesterol levels. The latter can be accomplished by reducing dietary saturated fat and cholesterol, which decreases bad cholesterol, and by increasing exercise, which increases good cholesterol. Several drugs are also available to modulate cholesterol levels. When cardiovascular disease becomes clinically evident (e.g., heart attack or stroke), treatment focuses on the surgical restoration of blood flow through the atherosclerotic artery using techniques such as angioplasty and arterial bypass grafts. In general, these treatments are aimed at slowing the progression and limiting the consequences of atherosclerosis; much less is known about ways to reverse the process once it has begun.

—Robert M. Sargis

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ASPERGER SYNDROME

Asperger syndrome (AS) is the term applied to the mildest and highest functioning end of the autistic (or pervasive developmental disorder [PDD]) spectrum, which ranges from AS to classic autism. People with AS typically display impairments in three areas: social difficulties (i.e., reading social cues, social awkwardness, and poor social skills), subtle communication problems (i.e., pedantic tone of voice and rate of speech, lack of fluidity in speech, difficulty understanding linguistic humor such as sarcasm and irony), and repetitive, rigid, or restricted behaviors (i.e., extreme interest in a topic or activity, insistence on particular behavioral routines). Compared with children with other autistic spectrum disorders, children with AS are characterized as having higher cognitive abilities and relatively normal language functioning.

Although Hans Asperger originally described children with this clinical picture in the 1940s, AS was not officially recognized until 1994 in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).* Within a year of one another, Leo Kanner and Asperger each published papers describing children displaying symptoms in each of the three areas of developmental impairment. Lorna Wing's (1981) paper was the major work to stimulate further review of Asperger's description and its relationship Kanner's. Wing estimated that Kanner's definition of autism applied to only 10% of children with autism, and she called attention to the need for new diagnoses or a broader definition of the disorder. Wing also changed the disorder's name from *autistic psychopathy* to *Asperger's syndrome.*

Research suggests that AS is considerably more common than autism. Whereas autism occurs in about 4 of every 10,000 children, estimates of AS have ranged as high as 20 to 25 per 10,000. Probably about 3 or 4 of every 1,000 children develop the full clinical picture of AS before about 10 years of age. Like autism, AS is much more common in boys than girls. In fact, studies suggest that males are about 5 times more likely to have AS than females are. Because females with AS sometimes exhibit different patterns of symptoms, prevalence figures may underestimate the proportion of females with AS in the general population.

AS is commonly associated with other disorders, including obsessive-compulsive disorder (OCD), attention deficit hyperactive disorder (ADHD), central auditory processing disorder (CAPD), Tourette's syndrome, hyperlexia (ability to read very quickly, but deficient understanding of verbal language), depression, and anxiety. Although these difficulties commonly appear alongside AS, the syndrome can exist by itself or in combination with other disorders as well.

AS is usually congenital or arises following brain damage sustained during birth or the first few years of life. It is uncommon for AS to appear as a consequence of brain damage suffered later in life. In some cases, there is a clear genetic component (i.e., one parent has AS). Research suggests that the genes involved do not cause AS but instead cause a variety of language and social differences and personality styles, of which the autistic spectrum disorders are the extreme form. The strengths of people with AS can run in families, too. Parents and siblings often have similar talents and interests as those of people with autism spectrum disorders. For example, strong visual-spatial, mechanical, and memory skills are often found in the families of people with autism spectrum disorders. Thus, AS is just one of several possible outcomes of having certain genes.

In addition to a genetic component, a number of other causes for AS and other disorders along the PDD continuum have been suggested, including infection during pregnancy or in the first years of life (e.g., herpes simplex virus); inherited immune system deficiency (e.g., diabetes); and various pregnancy, labor, and delivery complications. Although research supports many of these potential causes, there is absolutely no evidence to support the claim that the measles-mumps-rubella (MMR) vaccine plays a role in AS.

During the first 2 years, there might be nonspecific indications that development may not be quite normal; however, it is not possible at this early stage to determine the future course or the diagnosis. Some of the nonspecific symptoms (meaning that plenty of children who do not go on to develop AS also show these) include sleeping difficulties, poor attention, overactivity or extreme passivity, and poor body adaptability. Before age 2, some children with AS may also display classic autism symptoms such as heightened sensitivity to certain sensory stimuli; stereotypical, self-stimulatory behavior such as rocking; echolalia (excessive repeating of stock phrases previously heard); or difficulty with initiating or maintaining eye contact with others.

The *DSM-IV* requires basically normal early language development for a diagnosis of AS; however,

most children with AS have some delays in the development and understanding of spoken language. For instance, when other people try to communicate with these children, they may stare vacantly or overfixate on people or objects during communication. About one in three children with AS is quite delayed in speech development but begins using complicated phrases only a few months after starting to talk. Also, many children diagnosed with AS are awkward with their motor behavior in that they may be clumsy, have difficulty with balance or with judging distances, have poor fine motor coordination, and have an unusual gait or posture.

Between the ages of 3 and 5, the problems that children with AS have with social interaction and language become more evident. Preschool boys with AS tend to be more interested in toys and objects than their peers. In fact, they tend to withdraw from the group to engage in their own special interests. When they do interact with others, their actions are often awkward or rough (e.g., pushing or taking toys). Unlike boys, girls with AS seem to be have more social interests. The girls may fixate on others and may even smell, taste, or bite the people and objects around them. Interestingly, despite the inability of many late preschool-age children with AS to maintain normal social interactions and conversation, many are already good readers by this time.

Although some symptoms are present at earlier ages, AS is rarely diagnosed until the elementary school years. At about age 10, nearly all the characteristic symptoms are present. They tend to naïvely trust others, talk excessively, have difficulty forming friendships, and behave in emotionally inappropriate ways. They are often perceived as "being in their own world" and are limited by extremely narrow interest patterns. Children with AS can have a few interests at once and can change interests over time. The content is not so much the problem as is the way they become absorbed in their interest, leaving little time for anything else.

Another characteristic of AS is an obsession with rituals and routines that can be handicapping in early and middle childhood and very disruptive for the family. The routines are often linked to the child's special interests, but they can also interfere with daily activities such as eating, dressing, and brushing teeth. Although the *DSM-IV* does not include communication problems in the diagnosis of AS, most researchers believe that both speech and language are affected. Children with AS may have an excellent vocabulary but have difficulty understanding language in context and difficulty carrying on effective conversations. In addition, articulation problems are also possible. These communication problems may also affect nonverbal skills, resulting in inappropriate body language, poor facial mimicry, and a fixated gaze. Motor control problems continue to affect children with AS throughout adolescence.

Although people with AS face major difficulties, they also have tremendous strengths. They tend to have good general IQ, excellent rote memory, perseverance, and perfectionism. Thus, it is typically important to have appropriate education and treatment to ensure the best possible development for children with AS. Individuals with AS who have serious problems in the area of psychosocial adaptation may need a competent diagnostic workup. Most children with AS are able to function well in "normal," yet highly structured and predictable classrooms. To ensure the best outcomes, there should be a great deal of collaboration between parents, teachers, and other school officials (e.g., school psychologists) to determine the specific educational needs of each child. With training, other students can help teach children with AS socialization and communication skills. Social skills training can help people with AS and can also help facilitate communication with others. Individual talks with a psychologist or doctor may also have a positive effect, especially in times of depression or social isolation. Group sessions may also benefit older children and adults with AS.

As for medication, research has not indicated one pharmacological treatment that can effectively treat the basic impairments of AS. However, medications can often help treat some of the problems associated with AS. Serotonin reuptake inhibitors (SRIs) such as citalopram, sertraline, fluoxetine, fluvoxamine, and paroxetine can effectively treat mild to moderate depression, social phobia, and extreme rigidity and obsessive-compulsive symptoms for some AS children; others find antidepressants (e.g., imipramine and amitriptyline) and antianxiety medications to be more effective in treating these kinds of symptoms. Mild to severe ADHD symptoms can often be alleviated by central nervous system stimulants.

—Erin McClaren and Adam Winsler

See also Autism

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ASSIMILATION

In Piaget's theory of cognitive development, the purpose of children's thinking is to help them adapt to the environment in increasingly efficient ways. The techniques children use to adapt to the environment are called *schemes.* Schemes are action patterns that children transfer or generalize by repeating them in similar circumstances or in meeting recurring needs. A scheme can be a relatively simple pattern of actions, such as a baby grasping and shaking a rattle, or it can involve a complex series of actions, such as those used by an older child taking up a bat and swinging to hit a ball. Children, regardless of their age, have sets of schemes that are known to and used by them. For infants, schemes are largely reflexive (grasping an object laid in the palm), but as children mature, reflexive schemes are enlarged and enhanced as additional sensorimotor abilities develop. When children experience a need or a new stimulus in the environment, they take stock of the schemes already developed to determine how the need might be met or the new stimulus explored. When a match between the need or stimulus and an existing scheme is found, adaptation has occurred. If, however, a match cannot be identified, children proceed to either *assimilation* or *accommodation* to achieve adaptation.

Adaptation is a process of limited change—limited because only some things actually change during adaptation; other things remain the same. When children assimilate, it is their schemes that remain largely the same. During assimilation, children act on the environment or objects in the environment to make them fit into their existing schemes. Piaget believed that play is basically assimilation because during play children are acting on what they already know. Rules for games, roles in dramatic play, and toys and play equipment give children the opportunity to practice previously acquired schemes for social interactions and pretend responsibilities. For example, a child playing firefighter uses what he or she has learned from books, television, and visits to the fire station to act out the role of firefighter. In omitting the firefighter's training, fitness activities, and routine responsibilities around the station from his or her play, the child has unconsciously modified the role of firefighter to fit into existing schemes. The child has assimilated the role of firefighter, limiting it to only those things he or she has previously encountered.

Assimilation is the action of the child on objects in the environment, whereas accommodation is the action of the environment (objects) on the child. When accommodation occurs, children modify their schemes to fit new information or experiences in their environment. In Piaget's theory, assimilation and accommodation actually work together. During interactions with the environment, children's minds interpret information using existing schemes, but they also refine those schemes somewhat to fit particular experiences. Assimilation will dominate accommodation when children are intent on practicing recently formed schemes. Accommodation will dominate, however, during periods of intense learning and development.

—Jill Englebright Fox

See also Accommodation, Cognitive Development

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ASSISTED LIVING

Assisted living facilities (ALFs) are a relatively new type of housing for older adults, which provide variable levels of care in a dignified and homelike environment. ALFs fulfill the needs of older adults who are not able to live independently in their own homes but do not require the greater care provided in nursing homes. There is considerable variability among ALFs in terms of housing arrangements, services provided, social milieu, and cost.

Currently, assisted living is the fastest growing segment of the older adult housing industry. There are about 1 million ALF residents in the United States, and that number is expected to continue rising as the population ages.

CHARACTERISTICS OF ASSISTED LIVING FACILITIES

One of the defining characteristics of assisted living is that it provides residents assistance with activities of daily living (ADLs). Residents can expect to receive at least two meals a day, basic housekeeping services, transportation, and 24-hour access to staff. In addition, most ALFs have activity programs and social events, although the attendance at these events is often quite low. Many of the extra services available to assisted living residents are provided for a fee. For example, many ALFs charge residents for pharmaceutical services, bathing, laundry services, and driving them to medical appointments. The menu of services allows residents to customize their care to fit their needs and limitations. Some care requirements may disqualify someone from living in an ALF. For example, some facilities do not accept people who have behavioral problems, dementia, or urinary incontinence or need help with transfers (e.g., bed to wheelchair). The lack of uniform policies and services stems form the fact that there is no federal regulation of the assisted living industry; rather, individual states are responsible for regulating ALFs.

CHARACTERISTICS OF ASSISTED LIVING RESIDENTS

About 75% of residents are female, and a similar proportion of residents are unmarried. The average age of ALF residents is about 82 years. Many older adults move to ALFs after rehabilitating in a nursing home or hospital, but about half move there directly from their own homes. Most ALF residents have some health or mobility problem, which requires assistance with ADLs. In addition, it is rare for ALF residents to drive; therefore, the transportation services are important. Increasingly, many ALFs are caring for individuals with varying levels of cognitive impairment. Most residents stay in an ALF for several years.

COST

The cost of living in an ALF is highly variable and depends on a number of factors, including geographic region, size of living space (e.g., studio or apartment), extra services, availability of nursing staff, and overall quality of the facility. Most ALF residents use private funds to pay $1900 to $3500 rent on a monthly basis. Clearly, the cost of most ALFs is prohibitive for lower- and some middle-income older adults. However, many ALFs are now accepting residents who are on public assistance (e.g., Medicaid), and many older adults will "spend down" their savings in order to qualify for government assistance. The cost of high-quality ALFs often makes them available only to more affluent individuals.

FACILITY CHARACTERISTICS

There is an average of 50 residents per facility, but the number of residents varies from 12 to more than 100. Most assisted living units are private and designed for one person; however, most facilities also offer a limited number of rooms designed for couples. The average ALF is relatively new and has nicely furnished and decorated common areas. ALFs have become an increasingly safe place to live because of handrails, specifically designed bathrooms, and nonslip floors. All ALFs have a common dining area, and most

have other common areas (e.g., game rooms, sitting rooms, libraries, private dining rooms, and patios).

In most "stand alone" ALFs, the residents can vary the number of services they receive, but they cannot move to another area of the building to get more intensive nursing care. There are also multilevel retirement communities that can accommodate different levels of care. These multilevel campuses offer independent living options (e.g., condominium or cottage), assisted living, nursing home care, and sometimes memory wards for individuals with dementia. Some have called this approach "aging in place," and it has the benefit of not requiring disruptive moves when someone needs additional care.

Most ALFs transport residents to medical appointments. In addition, most have either an on-site nurse or one that will make regular visits to the community. Although the physical needs of residents are generally being met in ALFs, a number of researchers are reporting evidence that suggest residents' psychological needs are not being fully met.

PSYCHOLOGICAL ASPECTS OF ASSISTED LIVING

ALFs and the people who operate them generally do an excellent job of providing for residents' physical needs. However, because the staff perform many ADLs for residents, many residents do not get the cognitive stimulation necessary to maintain good cognitive and memory abilities. Residents do not necessarily have to make and remember appointments, plan meals, plan social events, remember to take medication, clean, go shopping, or do many of the other daily activities that challenge the mind and exercise the brain. Given the recent evidence in favor of the "use it or lose it" theory of memory and aging, it is important that older adults get enough cognitive stimulation. Some ALF residents live an active life; however, many do not get enough stimulation, which can lead to memory problems and possibly an increased likelihood of developing depression. There is considerable variation in the quality and participation rates of activity programs in ALFs. Therefore, it is important to consider the social milieu of ALFs because that may be related to the likelihood of developing depressive symptoms and also the quality and quantity of cognitive stimulation that residents receive.

The transition from independent to assisted living can be difficult for some residents. Many residents have experienced numerous losses that affect the quality of their social support networks. For example, because most ALF residents no longer drive, they have lost some of their independence and ability to visit friends and family. The typical ALF resident has lost his or her spouse, many close friends, and family members. It is often difficult for ALF residents to meet other residents once they move into a facility, especially if they are living around people with very different levels of cognitive functioning. Poor social support, in addition to medical problems, can lead to depression among ALF residents. A recent survey found that 25% of ALF residents had significant depressive symptoms, which is lower than nursing home rates, but higher than community dwelling rates of depression. ALF residents with depression are 1.5 times more likely to move to a nursing home than are individuals without depression.

Depression among older adults can lead to impaired cognitive functioning, which can lead to a need for more intensive care. Another risk factor among some ALF residents is memory loss and cognitive decline. Dementia is one of the primary reasons ALF residents are forced to move to facilities that provide additional care. However, high-quality ALFs can help people stay mentally, physically, and socially active.

—Robert G. Winningham

See also Older Adulthood, Oldest Old Age

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ASSISTED SUICIDE

Physician-assisted suicide (PAS) is the intentional termination of a human's life, at the explicit request of the one who dies, with the aid of a physician. The so-called "Doctor Death," Dr. Jack Kevorkian, brought attention to PAS when he assisted several terminally ill patients end their lives. Kevorkian was imprisoned for his activities.

Related to PAS is *euthanasia,* from the Greek term for "good death." Euthanasia is generally defined as including *active* euthanasia and *passive* euthanasia. Passive euthanasia is the hastening of death by withdrawing or altering a form of support. This includes removing life support, stopping medical procedures or medications, cutting off food and water, and not giving cardiopulmonary resuscitation (CPR) to a person whose heart has stopped. Active euthanasia is the causing of death of a person by way of a direct action, in response to a request from that person. Active euthanasia is usually accomplished by supplying the person wishing to die with the means to end life, often with the help of a medical doctor. The means may include barbiturates, carbon monoxide gas, or coma-inducing levels of the drug morphine.

The U.S. Supreme Court ruled in two companion cases that the states have the right to decide individually on the legality of assisted suicide. The cases were *Vacco v. Quill* and *Washington v. Glucksberg,* both decided in 1997. Although the Court did not hold that there is a constitutional right to assisted suicide, it did hold that states can pass their own laws dealing with the subject. The Court wrote that patients did have a right to palliative (pain-reducing) care, even if that care resulted in the hastening of death of the patient.

In the United States, only Oregon has legalized physician-assisted suicide. Oregon's Death with Dignity Act, passed in 1996, is a comprehensive piece of legislation outlining the steps patients and physicians must follow to end the life of a terminally ill patient. From 1998 through 2003, 171 terminally ill patients were reported to have died after ingesting lethal doses of medications. Efforts to pass similar legislation in other states have failed. Thirty-eight states have laws that specifically ban assisted suicide by statute. Six states have no laws regarding assisted suicide; other states criminalize assisted suicide through the common law. Of the states that have no laws regarding assisted suicide, most do have laws prohibiting euthanasia.

According to statistics released by Oregon, men and women were equally likely to use PAS in Oregon. Terminally ill younger patients were much more likely to request and receive PAS than older citizens; 18- to 34-year-olds were 5 times more likely to use PAS than were those 85 or older. Oregon Asians were about 3 times as likely to die by PAS than whites in Oregon. Divorced and never married citizens were about 2 times more likely to use PAS than married and widowed citizens. The use of PAS has been strongly associated with a higher level of education; Oregonians with a bachelor's degree or higher were more than 7 times more likely to use PAS than those who did not graduate from high school. People with amyotrophic lateral sclerosis (ALS), HIV/AIDS, and malignant neoplasms were most likely to use PAS.

The American Medical Association and the American Nurses Association both have official stances against assisted suicide. Both organizations state that allowing health care providers to assist in death violates the ethical traditions of physicians and nurses. No major religions in the United States condone the practice.

Internationally, only the Netherlands allows PAS. Although there is no legislation officially condoning PAS, the laws of the country are written to ensure that physicians who assist a terminally ill patient in dying will not be prosecuted.

—Lawrence A. Liggett

See also Suicide

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ASTHMA

Asthma is a chronic, inflammatory disorder of the airways associated with variable airflow obstruction that reverses either spontaneously or with treatment and bronchial hyperresponsiveness to a range of triggers such as tobacco smoke, cold air, exercise, and strong emotion. It is characterized by recurrent episodes of wheezing, breathlessness, chest tightness, and cough that are usually more pronounced at night and in the early morning.

ASTHMA PREVALENCE

Asthma is an increasingly common and chronic disorder that affects the health and quality of life of a considerable number of children and adults worldwide. This disease is estimated to afflict more than 100 million people globally; in the United States, 16 million people (7.5% of the population) report having been diagnosed with asthma, two thirds of whom are younger than 18 years. In 2000, asthma was responsible for 4,487 deaths, 465,000 hospitalizations, and an estimated 1.8 million emergency department visits.

Asthma prevalence, morbidity, and mortality increased exponentially among U.S. adults between 1980 and 1999, with a substantial 75% increase in prevalence between 1980 and 1994. Asthma prevalence varies by age, gender, and ethnicity. For example, more children than adults have asthma, and among children, more boys than girls have asthma; however, in adolescence, these rates begin to change, although at exactly what point and by what mechanism this change occurs is not known. Compared with males, adult females have higher asthma prevalence rates and higher asthma-related mortality rates. Recent reports suggest that asthma-related mortality rates have been declining since 1996; however, it is also noted that disparities remain between rates for non-Hispanic whites and other ethnic minority groups, particularly African Americans, in regard to asthma-related emergency department visits, hospitalizations, and deaths. Several probable factors have been recognized as contributing to these disparities, but identifying interventions to ameliorate their effects has proved more difficult. For example, ethnic minorities are more likely to be poor, uninsured, and undereducated—all factors associated with suboptimal health status, increased morbidity, underutilization of health services, and poorer health outcomes.

Studies have also revealed that asthma is far more common in Western countries than in developing countries; it is more prevalent in English-speaking countries; and as developing countries become more westernized or communities become more urbanized, asthma prevalence increases. These features of asthma prevalence have led to new directions in asthma research other than examining the established risk factors (i.e., allergen exposure and atopy). Recent attention has focused on the interaction between environmental and lifestyle factors in the developed world. For example, the trend toward greater obesity in the developed world has led to a closer scrutiny of an association between asthma and obesity.

In addition, some researchers have begun to examine in utero exposure as well as exposure (or lack of exposure) in the early years that may make an infant susceptible to the development of asthma. Certain issues have emerged as significant in predisposing infants to asthma, such as being born premature, low birth weight, or both, and in utero, as well as postnatal, exposure to tobacco smoke. Research also suggests that a small family size is associated with an increased risk for asthma development. The reason is unclear, but it is suggested that a small family size reduces an infant's exposure to older siblings, in turn reducing exposure to infections and thereby increasing the risk for atopic disease at older ages.

Another explanation for the increase in prevalence that has garnered a great deal of interest is the "hygiene hypothesis." The premise is that exposure to naturally occurring infections and microbes essentially immunizes individuals against asthma and other diseases and that reductions in these exposures during the past century, due to the cleaner living of industrialized societies, has led to the increase of allergic diseases such as asthma. Some support for this hypothesis comes from a large U.S. study that found that previous exposure to hepatitis A and herpes simplex virus 1 infections was associated with less asthma, hay fever, and allergen sensitization.

ASTHMA DEVELOPMENT

A summary report from a national survey estimated that 9.3 million annual office visits result in a new, principal diagnosis of asthma, and evidence suggests that a large portion of new diagnoses can be attributable to children. In fact, research indicates that asthma onset occurs early in childhood, often before 2 years of age. Epidemiological studies have suggested that there are several different asthma phenotypes that follow a common final pathway characterized by recurrent airway obstruction. Transient wheezing, one phenotype of asthma, for example, usually resolves by age 3 and is not associated with a family history of asthma or allergic sensitization. Nonatopic asthma, another phenotype, is precipitated by viral infection. Many school-age asthmatic children have been found to have a history of airway obstruction their first 2 to 3 years of life, and in many cases, this obstruction is associated with viral infection. Studies reveal that this infection increases the risk for wheezing up to age 10, but then the risk decreases with age and is no longer significant at age 13.

The third phenotype is atopic asthma. Asthma that begins early in life is often associated with atopy, the genetic predisposition for sensitization to allergens; and allergic sensitization seems to be an important precursor to persistent asthma. Half of the cases of persistent asthma begin before age 3, and 80% begin before age 6; evidence indicates that early onset of symptoms is associated with increased severity of the disease and increased bronchial hyperresponsiveness. Moreover, patients with early-onset asthma also have considerable deficits in lung function growth. Thus, research suggests that mild asthma during childhood may resolve, but in most cases, asthma is a progressive condition, especially in children with a severe form of the disease. These findings highlight the need for early treatment not only to control the often debilitating effects of the disease but also to prevent the irreversible structural lung change or airway remodeling that can lead to permanent airway obstruction.

ASTHMA MANAGEMENT AND TREATMENT

The National Asthma Education and Prevention Program (NAEPP) guidelines are considered the gold standard for asthma diagnosis and management. The guidelines recommend a stepped-care model of pharmacotherapy treatment matched to level of asthma severity that should determine successfully managed disease and good health outcomes. There are four levels of asthma severity (mild-intermittent, mild-persistent, moderate-persistent, and severe-persistent) that are distinguished by a combination of factors such as lung function and day and nighttime symptoms. The multiple goals of effective asthma therapy are to prevent chronic and bothersome symptoms such as day or nighttime coughing or breathlessness or exacerbations after exertion, to maintain normal or near-normal lung function, to maintain normal activity levels, and to prevent recurrent exacerbations and reduce the need for emergency department visits or hospitalizations. In addition, the patient's asthma should be controlled with the least amount of medication necessary, reducing the possibility of adverse effects.

Asthma medications are categorized into two general classes: long-term control medications used to achieve and maintain control of persistent asthma and quick-relief medications used to treat acute symptoms and exacerbations. Current asthma therapy is based on the concept that chronic inflammation is a major feature of asthma. Subsequently, inhaled steroids, the most potent anti-inflammatory asthma medications, have emerged as the cornerstone of the management of persistent asthma, even in young children. There are, however, many medications that can be used at each level of asthma severity, and it is up to the physician to judge the individual patient's needs and to determine at what step to initiate therapy. The list of medications can be found in the NAEPP guidelines.

Asthma management in children is exceptionally challenging because assessment is primarily based on symptoms and pulmonary function cannot be measured reliably in young children and infants. The approach to asthma control is similar, and the same classifications are used; however, pharmacotherapy can also pose a challenge, given that adequacy of medication delivery is often in question. In addition, there is a limited amount of information on the appropriate dosage of medications for children younger than 5 years; however, recent studies have recognized inhaled corticosteroids as the preferred long-term controller for all levels of persistent asthma in all age groups.

IS THERE A CURE?

A great deal has been learned in recent years about the pathogenesis and progression of asthma that has

led to new directions in the management of childhood asthma. These directions include the need for early recognition and early intervention with environmental controls and long-term control therapy (inhaled corticosteroids) to prevent adverse effects later in life, but a great deal remains to be learned. It is possible that with the right interventions, the disease could be controlled on a long-term basis and that thus a remission or relative "cure" could be sustained; however, no specific cure as yet has been found for this disease.

—Dolores V. Hernandez

See also Allergy

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ATHLETICS

Few aspects of Western culture touch as many people or command as much attention as athletics. Historically, athletics helped shape the beliefs, values, and behavior of many societies. The Greeks, for example, created the Olympic games to celebrate cultural, artistic, and individual excellence. Athletic training was part of every Greek boy's education and was intended to instill "arête," meaning a sense of skill, dignity, honor, and valor. Today, many people believe strongly that athletics builds character and helps individuals develop the physical, social, and emotional competencies required to succeed in the modern world.

TRENDS IN PARTICIPATION

Athletics and organized sport are distinguished from physical activity by their systematic structure and competitive nature. Although there is no precise accounting of the number of youth or adults who participate in sports programs, estimates suggest that 15 to 20 million 5- to 18-year-olds participate in community sports programs and an additional 6 million 14- to 18-year-olds are involved in school athletic programs. Youth sport participation increased substantially over the second half of the 20th century, but recent evidence suggests a leveling or decline in overall rate. Patterns in these rates vary by sport, age, gender, racial or ethnic status, and socioeconomic status.

Although the number of youth playing historically popular team sports of basketball, baseball, soccer, football, and volleyball remains high, only soccer and basketball have increased participation since 1990. Participation in organized athletics peaks in childhood and adolescence, whereas younger children and adults are more likely to engage in sport or physical activity on their own. By age 15, however, 75% of youth drop out of sports. Athletics has always involved more males than females, although this gap is closing. The Title IX legislation of 1972 dramatically

increased opportunities for girls to participate in school-based athletics. Since then, the number of female athletes has increased more than 800%. In nonscholastic sports, however, girls start later (10 years old vs. 8 years old) and drop out earlier than boys. Minority youth of all ages are less likely than whites to be involved in athletics. Lack of opportunity may be a primary factor for this disparity. Although athletic programs flourish in wealthier communities, poor urban communities, which are overrepresented by minority individuals, may not have the financial and social capital to provide adequate facilities, supervision, or programming.

BENEFITS AND DISADVANTAGES TO ATHLETIC PARTICIPATION

The reasons for and the benefits of participating in athletics cluster into three primary areas of human development: (a) *physical development* (e.g., get exercise and stay in shape, learn and improve physical skills, demonstrate physical competence), (b) *affective-motivational development* (e.g., have fun, be active, do something challenging), and (c) *social development* (e.g., play as part of a team, make new friends, get coach's/parent's approval).

The *Surgeon General's Report on Physical Activity and Health* clearly documented the physical health and fitness benefits derived from regular physical activity, including athletic participation. Youth sports help children stay fit and develop the fundamental motor skills needed for advanced skill development across sports and leisure contexts. Basic skill development promotes positive perceptions about ones' athletic abilities and facilitates lifetime interest, enjoyment, and participation in physical activity. Youth who play sports tend to maintain more active lifestyles through adulthood, reducing their lifetime risk for obesity and related health problems.

Conversely, sport participation also carries heightened risk for physical injury. Almost half of youth athletes report having at least one injury during an athletic season. Sixty-five percent of injuries are minor, but at least 3 to 5 million youth suffer some form of sport-related injury each year that is serious enough to require emergency room treatment. Risk for injury is elevated by age (older), type of sport (collision and contact), lack of coach education regarding injury, hazardous field and playing conditions, inadequate equipment, and training errors or poor instruction.

Athletics is a key context for experiencing and expressing emotions, both positive and negative. More is known about sport's influence on negative emotions (e.g., anxiety, shame, anger) than positive emotions (e.g., enjoyment, pride from accomplishments). Young athletes' enjoyment is related to intrapersonal factors, such as perceived competence and approach-oriented achievement goals, and to interpersonal factors of lower parental pressure, more parental emotional involvement, and better teaching environment. Sport enjoyment is also related to positive outcomes such as sport commitment and long-term participation.

In contrast, sport participation sometimes elicits negative emotions such as anxiety, shame, and anger. Sport anxiety is related to the intrapersonal factors of low self-esteem, avoidance-oriented achievement goals, and performance expectations, and to the situational factors of higher parental pressure and greater social evaluation. Youth experiencing high levels of sport anxiety are likely to have more problems with injury, gastrointestinal ailments, and sleep or eating disturbances. They are also more likely to drop out of sports. Sports, as competitive and evaluative contexts, are ideal for helping youth recognize and regulate their own emotions and develop emotional intelligence (e.g., empathy, effective interpersonal skills).

Development of social competence, as reflected in one's peer interactions and peer relations, is also central to the athletic context. Athletes report considerable social benefits of participating in sports, such as making friends, enhancing social skills, and gaining confidence in relating to peers. It is not known, however, whether athletics promotes these more than other structured activities. In general, athletic competence is strongly associated with peer acceptance for children and adolescents. Male and female high school athletes who are participating in traditionally gender appropriate sports are more likely to be rated as popular by their peers. Often, athletes develop a "best friend" friendship with someone involved in their sport or on their team. Help and guidance, emotional support, good conflict resolution, loyalty, intimacy, trust, and prosocial behaviors typically characterize these friendships. Close friendships and cohesive teams, however, can also have negative influence on individuals' sociomoral development. Athletes are more likely to commit aggressive acts or cheat during competition if prevailing team or friends' norms and beliefs condone these behaviors.

SYSTEMS AND CONTEXTUAL VIEW OF ATHLETICS

The benefit from athletics, particularly for youth, is substantially a function of the quality of the interactions youth have with involved adults (e.g., parents, coaches, officials, and spectators) and the structure and philosophy of the community organizations overseeing sports programs.

Parents exert a powerful influence on youth sport experiences. They are usually the ones to initiate and encourage their children's participation in athletics and have a positive effect on experiences by reinforcing skill development, praising effort, modeling appropriate behavior, and focusing on their children's needs and expectations. Conversely, parents can undermine youth sport experiences by exerting pressure, by behaving inappropriately, and by using unkind words and actions.

Coaches also determine the quality of youths' athletic experiences. Despite their powerful socializing influence, little is known about coaches' characteristics. Most volunteer youth sport coaches are involved because their child is participating. They commonly have some athletic experience, but only about 10% are trained in coaching techniques. Experimental research has indicated that coaches can be trained to use specific techniques for encouraging their players, for helping their players to develop skills, and for avoiding punishment and negative interactions. Youth who play for trained coaches experience less anxiety, higher motivation, higher perceived competence, and greater enjoyment and are more likely to return to play the following year. Trained coaches also help build self-esteem, especially in those players who start the season with low self-esteem. Coaches who use positive praise and instruction frequently and liberally, and eliminate punishing tactics, are more likely to foster the positive psychosocial effects of athletics.

The operating structure and philosophy of the athletic organization are also critical influences. Some youth sports leagues have adopted a more "professional" philosophy that has contributed to a "win at all costs" mentality and to increased competitiveness, expectations, and pressure on youth. Additionally, many young athletes are exposed to values that tolerate disrespectful behavior and cheating. These factors contribute to high rates of negative experiences, "burnout," and dropout. Overall, evidence indicates that the benefits of athletics come not from simply participating, but from participating in a program in which there are positive interactions with caring, supportive adults and in which the teaching of sport skills and healthy development are purposefully planned and structured.

—J. Douglas Coatsworth and David E. Conroy

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ATTACHMENT

Very few topics in the field of human development have garnered as much attention as the nature and significance of the parent-child relationship. The theoretical approach to parent-child relationships that has generated the most extensive research, social policy changes, and controversy is attachment theory. At the core of attachment theory is the premise that early relationships are critical for a child's development. First articulated in the 1950s by London psychiatrist John Bowlby, the normative components of attachment theory integrate principles from fields as diverse as psychoanalysis, ethology, and cognitive science. Bowlby later incorporated into his theory a systematic conceptualization of individual differences in parent-child relationships, based on the pioneering work of his colleague Mary Ainsworth at Johns Hopkins University. Empirical research on attachment has since exploded and continues to be central to the study of socioemotional development across the life span.

HISTORICAL ROOTS OF ATTACHMENT THEORY

During his training as a psychiatrist in the 1930s and 1940s, Bowlby's interest in the importance of

early experiences with caregivers was sparked by a growing collection of clinical case studies, including his own observations of juvenile thieves. These reports revealed that some individuals who had experienced lengthy or repeated early separations from their parents were later observed to be superficially and indiscriminately friendly, emotionally flat, and aggressive; failed to form meaningful emotional connections to adults or peers; and often lied and stole. These retrospective findings complemented the results of prospective studies of children's behavior during separations from parents, documented most memorably in a series of films by Bowlby's collaborator James Robertson. These reports revealed that children older than 6 months who were separated from their parents progressed from an active phase of protest, during which they cried and called out hopefully for hours or days, to a passive phase of despair, during which they sobbed weakly and refused food and comfort. Some children then entered a phase of detachment, during which they became generally aggressive as well as superficially and indiscriminately friendly. Upon reunion with parents, even children returning to loving homes exhibited a period of unusual clinginess and hostility that lasted weeks or months; those who had become detached also temporarily failed to recognize the previously preferred parent. These findings on early separations were further complemented by studies of children reared in institutions without consistent caregivers. These children often suffered difficulties in forming selective emotional ties and, in some cases, also suffered other behavioral or psychological disturbances that persisted even after adoption.

Bowlby summarized this collection of findings in a report to the World Health Organization in 1951, concluding that stable early relationships with caregivers are as necessary to a child's mental health "as are vitamins and proteins for physical health." The evidence presented in this report initiated social policy changes that emerged over the subsequent decades. For example, parents began to be allowed to stay in the hospital with their ill children, prospective adoptive parents began to be encouraged to adopt children as early in life as possible, orphanages began to provide more personalized care for their children, an organized foster care system emerged, and parents lessened their casual temporary use of residential nurseries. In the wake of his report and the ensuing policy changes, Bowlby turned his attention to explaining the phenomena he had documented, carefully examining existing theoretical views.

Psychoanalysis emphasized several issues relevant to the nature and significance of the early parent-child relationship. First, many psychoanalysts emphasized that psychological disturbances emanated not from real experiences but from unresolved fantasies related to parents. However, a group of psychoanalysts who came to be known as *object relations theorists* challenged this view, drawing on the findings discussed earlier. Despite this challenge, these clinicians nevertheless retained allegiance to psychoanalysis by explaining the influences of early experiences using other key aspects of the theory. They asserted that the ego—responsible for the development of emotions, intelligence, language, and the control of bodily functions—developed based on the mother satisfying as well as frustrating the infant's biological drives such as hunger. They asserted that the emotional ties that infants form to their mothers were, in fact, a secondary by-product to the reduction of the hunger drive. In addition, these psychoanalysts did not believe that children had the cognitive capacity to mourn. Thus, as long as an infant had caregivers who could satisfy and frustrate his or her biological drives through consistent personalized attention, these caregivers could be interchangeable.

Other contemporary views downplayed the importance of an emotional bond to a consistent caregiver altogether. The biological-maturational perspective, popular within the eugenics movement and among psychologists concerned with developmental milestones, viewed the child as a genetic entity unaffected by external forces. In fact, prominent representatives of this view discouraged early adoption on the grounds that adoptive parents who delayed choosing a child could better identify a child's defects and physical characteristics. Within the biological-maturational perspective, deleterious effects of separation and institutionalization were thought to be due to biological defects in the child.

Proponents of environmental learning views deemphasized the role of emotional bonds for quite different reasons. Early behaviorists viewed parental affection as dangerous to the development of a child's character because, for example, it reinforced bothersome behaviors such as crying. Consequently, these theorists advised parents not to hug or kiss a child, pick up a crying child, or feed on demand. In the wake of the findings on institutional care, later learning

theorists proposed that "maternal" deprivation was simply stimulus deprivation. Specifically, these researchers suggested that children separated from parents experienced psychological and behavioral problems not because they lacked emotional bonds but because they lacked an important source of perceptual input and reinforcement.

Bowlby concluded that none of these theories adequately explained the research findings on early separations and institutional care. Consequently, he devised a new theory of the parent-child relationship. First proposed in 1958 in an article titled "The Nature of the Child's Tie to His Mother," then expanded and refined in his trilogy *Attachment* (1969), *Separation* (1973), and *Loss* (1980), Bowlby's theory integrated his training in psychoanalysis with evolutionary biology, ethology, control systems theory, and cognitive science. Bowlby proposed that specific emotional ties to parents are primary and based on survival—not secondary by-products of feeding or perceptual stimulation. Bowlby further proposed that caregivers are not interchangeable and that real experiences influence behavioral and psychological functioning throughout the life span. Over the past three decades, many researchers have contributed significant insights and nuance to Bowlby's theory.

ETHOLOGICAL ATTACHMENT THEORY

The crux of attachment theory is that all infant ground-dwelling primates possess a biologically based attachment behavioral system that evolved through natural selection to promote survival. Unlike other animals who flee to a borough or a den for protection, young primates are completely dependent on the care of older members of their species for protection from predation, starvation, freezing, and other dangers. By the time they are 6 to 9 months of age, almost all infants have formed enduring emotional ties, or "attachments," with one or a few specific significant caregivers who serve these protective functions by virtue of their own caregiving behavioral system.

The attachment system functions to automatically motivate an infant to seek physical proximity to an attachment figure in times of threat—to use the attachment figure as a haven of safety. Threats that activate the attachment system may be internal, such as illness or fatigue, or external, such as darkness or an approaching animal. Many fears are thought to be based on the presence of one or more biologically based natural clues to danger, such as being alone, strangeness, rapid approach, and sudden changes in stimulation. The activation of the attachment system is terminated either by the elimination of the threat or through proximity to the caregiver—achieved through social signals and behaviors as superficially diverse as crying, smiling, vocalizing, approaching, following, and clinging.

The attachment system works in conjunction with several other biologically based control systems. In times of threat, attachment is activated simultaneously with the fear system, which motivates the individual to flee from the source of alarm. Because the attachment and fear systems both function in the service of immediate survival, their activation typically takes priority over other behavioral systems in times of threat. However, in the absence of threat, activation of the attachment and fear systems is typically replaced by activation of the exploration and affiliation systems. Exploration and affiliation are crucial to long-term survival because they allow the infant to learn about and engage in the physical and social environments. Under these nonthreatening circumstances, the infant uses the attachment figure as a secure base for discovering the world—keeping the attachment figure nearby lest threat reemerge. Under optimal circumstances, an infant achieves balance between attachment/fear and exploration/affiliation—focused inflexibly neither on threat nor away from it.

Because protection offered by adults is indispensable for infant survival, almost all infants become attached to their primary caregiver—even when that caregiver is maltreating. The process of forming an attachment typically follows four general phases. Initially, infants nonpreferentially send out social signals such as crying and smiling that elicit care from different adults. Then, in the second or third month of life, infants begin to discriminate caregivers and to develop differential expectations related to the consistency, contingency, and appropriateness of care that they receive. Even in the earliest weeks of infancy, social stimuli are perceived as unique and significant, and it is toward these stimuli that infants direct their social signals. However, infants in these first two phases have not yet developed a well-formed concept of the parent as existing when out of sight and thus are not yet selectively attached. Consequently, infants who are separated from their primary caregivers during these phases do not mourn their loss and respond well to consistent substitute caregivers. Infants who

do not receive a substitute caregiver but rather are cared for in an impersonal group setting often fail to flourish; if these infants are not reunited with their caregivers or never receive a substitute caregiver, they will lack the opportunity to form attachments and may suffer some of the socioemotional or behavioral problems described previously.

Sometime between 6 and 9 months, infants begin to show the first signs of true attachments to those caregivers who have responded consistently and contingently (whether positively or negatively) to their social signals. Although infants often form more than one attachment, they typically prefer one figure to the others. At this time, infants begin to use their attachment figures as a secure base and a haven of safety. In addition, they begin to demonstrate stranger and separation anxiety and to protest separations for days or weeks after they have occurred. These emotional responses are conceptualized as biologically adaptive because they lead infants to engage in behaviors that increase their chances of survival. Specifically, haven-of-safety behaviors oriented toward an attachment figure provide immediate protection, whereas secure base behaviors, stranger anxiety, and separation anxiety function to keep the haven of safety accessible. Likewise, the phase of protest following separation is active and hopeful, involving a variety of social signals oriented toward alerting and drawing the absent caregiver.

Finally, as the infant becomes a young child, he or she becomes increasingly adept at integrating his or her own goals with those of attachment figures as well as negotiating with those figures—promoting the development of a "goal-corrected partnership." It is this increasingly reciprocal form of attachment relationship that continues to be influential throughout the life span—with parents, very close peers, and significant romantic partners. Although needs for physical proximity are less acute than they were in infancy, cognitive advances allow children and adults to rely increasingly on psychological proximity to attachment figures and, provided that these caregivers have been sensitively responsive, to carry a sense of "felt" security. Whether in infancy or beyond, attachments are a special kind of bond that is based on protection and survival, are long lasting, and are characterized by high emotional involvement. Thus, all relationships cannot be considered true attachments. In addition, not all aspects of relationships are relevant to the attachment system—attachment refers specifically to aspects related to fear, distress, protection, and comfort and not to aspects such as play, morality, discipline, achievement, or intellectual growth.

Throughout the life span, individuals are thought to form and maintain complementary mental representations of the self, others, and relationships. The content of these models reflects an individual's expectations about how an attachment figure will respond when one is frightened, hurt, ill, or otherwise upset. These expectations are thought to develop largely based on a real history of interactions within those relationships. Although these relationship-specific "internal working models" do not capture every aspect of reality, they allow the individual to make predictions and plan actions within these relationships. Over time, these models are stable as well as dynamic. They resist change because they easily assimilate information that confirms expectations about the self and others. However, working models necessarily transform and update in response to changes in relationships and life circumstances (e.g., parental divorce or unemployment) as well as in response to cognitive and social developments (e.g., increasing capacity for abstract thought and a broadening social sphere). Over the life span, individuals gain an ever-increasing amount of information about different relationships across a variety of domains. The overarching attitude about attachment that emerges from the more specific working models has been termed *state of mind with respect to attachment.* It is these mental representations of relationships that serve as the basis for individual differences in attachment patterns.

INDIVIDUAL DIFFERENCES IN ATTACHMENT IN INFANCY AND CHILDHOOD

Attachment theory has perhaps been expanded most significantly by a systematic conceptualization of individual differences in attachment behaviors and representations, first identified in infants by Mary Ainsworth in the 1960s and later expanded and refined by other researchers. Between the ages of 12 and 18 months, these differential responses to stress are indexed behaviorally using the "strange situation," a controlled laboratory procedure designed by Ainsworth. In this procedure, a parent and infant are twice separated and twice reunited in an unfamiliar toy-filled room. This procedure is meant to be just stressful enough to activate the child's attachment system because of the presence of multiple natural clues

to danger (being alone, in a strange room, with a strange experimenter), but not so stressful that the child cannot employ a strategy to cope with the fear. Based on their behaviors within the strange situation, infants are assigned to one of four classifications; three groups were identified in Ainsworth's original work, whereas a fourth group was later added to the system based on work in Mary Main's laboratory at the University of California, Berkeley.

Infants are classified as "secure" when they balance their attention and behaviors between attachment (when stressed by the separations) and exploration (when physical or psychological proximity to the parent is achieved). Even if not visibly distressed, these infants show signs of missing the parent when separated, then are glad to see the parent upon reunion. Infants who are overtly distressed by the separations are calmed when reunited with the parent and are able to return to play. The secure pattern is associated with sensitive caregiving, such that the parent notices the infant's signals, interprets them correctly, and responds to them promptly and appropriately. In low-risk samples worldwide, about 60% of infants are classified as secure, with the remaining infants classified as one of three forms of insecure.

Infants are classified as "ambivalent-resistant" when they show extreme distress at the parent's departure, then are inconsolable and often angry upon reunion, unable to turn their attention away from the parent and back to exploration. Infants are classified as "avoidant" when they show little concern for the parent's departure then avoid the parent on reunion. Although infants displaying the avoidant pattern often appear to focus their attention on exploring the toys, their stress is belied by elevated heart rate and stress hormones as well as decreased quality of play. Ambivalent-resistant and avoidant patterns are associated with a variety of forms of insensitive caregiving, especially inconsistency (in the case of ambivalent-resistant infants) and rejection of infant bids for attachment (in the case of avoidant infants). Both patterns typically are conceptualized as insecure responses to threat and distress, in that they do not allow for the optimal balance of attachment and exploration. However, because these strategies are thought to develop based on insensitive parental care, they are conceptualized as organized and adaptive alternatives to the flexible secure strategy.

An organized behavioral strategy is not evident in a fourth group of infants. Instead, these infants show any of a variety of unusual behaviors such as freezing in anomalous postures, rocking, and contradictory behavior patterns such as approaching the parent with head averted. These infants are classified as "disorganized-disoriented," and are thought to display a collapse in an otherwise organized behavioral strategy. Consequently, the disorganized classification is always assigned in conjunction with the best-fitting organized strategy (secure, avoidant, ambivalent-resistant)—the strategy thought to collapse. In contrast to the association of organized patterns of attachment with various degrees of parental sensitivity, disorganized infant behavior is predicted by caregiving that is either maltreating or subtly frightening (e.g., quasi-dissociative). Infants are thought to develop disorganized responses to such caregiving because they are placed in a behavioral paradox. When frightened, an infant seeks to flee from the source of threat and flee toward the attachment figure. When the attachment figure is the source of alarm, the infant cannot employ an organized strategy to cope with the fear.

The strange situation has been associated with a wide range of behavioral correlates in childhood and adolescence. Several longitudinal studies, including seminal work in the laboratories of Alan Sroufe and Byron Egeland at the University of Minnesota, have revealed that children and adolescents classified as secure with mother in infancy, compared with those classified as insecure, demonstrate higher levels of empathy, social competence, ego-resilience, self-reliance, internalization of moral standards, and leadership abilities; they also show lower levels of aggression, anxiety, anger, and dependence. Although children classified as insecure in infancy have shown difficulties in many of these areas overall, avoidance and disorganization have, in particular, been associated most strongly with aggression, whereas ambivalent-resistance has been associated most strongly with anxiety and dependence.

In addition to its behavioral and representational correlates, security has been associated with various manifestations of resilience and is considered a protective factor for development. In contrast, insecure attachment is considered a risk factor that, in concert with other factors, may contribute to the development of various forms of psychopathology. Among those later diagnosed with psychopathology, avoidant attachment in infancy, especially when it occurs in conjunction with disorganization, has been most strongly

associated with externalizing disorders such as conduct disorder, ambivalent-resistance with internalizing disorders such as anxiety, and disorganization with dissociative disorders.

The strange situation has served as a source of validation for other indexes of attachment quality, including the Attachment Q-Sort in infancy, as well as an assortment of assessment procedures for children in preschool and early elementary school. Behavioral assessments in childhood typically involve age-appropriate separation and reunion procedures, whereas representational assessments typically involve asking children to respond to hypothetical scenarios presented on picture cards, to engage in doll play, or to draw pictures of their families. However, the literature using these childhood procedures is small compared with literature grounded in the strange situation or the Adult Attachment Interview—the procedure that opened up the now-burgeoning field of adult attachment.

INDIVIDUAL DIFFERENCES IN ATTACHMENT IN ADULTHOOD

The assessment most commonly used by developmental and clinical researchers to assess attachment in adolescence and adulthood is the hour-long Berkeley Adult Attachment Interview (AAI), developed in the laboratory of Mary Main. The AAI involves describing and evaluating early attachment relationships, loss of attachment figures, and the possible relation between those experiences and later personality development. Unlike the strange situation, the AAI does not assess attachment quality in relation to a single other, but rather assesses an overarching state of mind that is applied to thinking about attachment-related events in the past and present. Furthermore, the AAI is not scored based on experiences explicitly described, but rather on the interview's internal consistency and the speaker's collaboration with the interviewer.

The AAI identifies three organized and adaptive patterns for thinking about threat and distress. Adults are classified as "secure-autonomous" in the AAI when they are able to reflect on positive and negative (even traumatic) memories in a manner that is not excessive in length yet is still complete, semantically consistent, flexible, thoughtful, and valuing of relationships. Individuals are classified as "dismissing" on the AAI when they provide terse discourse and unsupported statements about parents. These interviews often idealize rejecting parents, show an insistence on lack of memory for childhood, distort rejection as a positive force, emphasize personal strength and independence, and devalue the need for relationships. Individuals are classified as "preoccupied" on the AAI when they provide long interviews full of irrelevant details, digressions, and current anger. Individuals are assigned to "cannot classify" when they exhibit high levels of more than one of these three linguistic strategies.

Adults are classified as unresolved-disorganized on the AAI when they show lapses in speech or reasoning during discussions of loss or trauma that are analogous to the lapses in behavior demonstrated by disorganized infants during the strange situation. Lapses in reasoning include, for example, speaking as though the dead person was simultaneously alive in the physical sense. Lapses in discourse include, for example, falling silent for many seconds then resuming discussion without acknowledging the silence. As in the case of behaviorally disorganized infants, unresolved status in adults is viewed as a collapse of an otherwise organized representational strategy and is always assigned in conjunction with the best-fitting organized category.

Samples worldwide have found AAI classifications to remain stable for up to 4 years and to be unrelated to intelligence, general memory capacities, general discourse patterns, or self-reports of attachment quality. Instead, the AAI consistently predicts the behavior of one's child in the strange situation—the purpose for which the interview was originally designed. Specifically, a parent's secure-autonomous classification in the AAI predicts infant security; a parent's dismissing classification predicts infant avoidance; a parent's preoccupied classification predicts infant ambivalent-resistance; and a parent's unresolved classification predicts infant disorganization. These predictions are thought to be mediated by parental behavior toward the infant across the previous year. In addition, in some middle-class samples, one's AAI classification can be predicted by one's strange situation classification nearly 20 years prior.

Furthermore, the AAI is associated with a variety of mental health variables. Individuals classified as secure-autonomous experience a lower incidence of mental illness overall. In contrast, among those diagnosed with mental illnesses, the dismissing classification has been most strongly associated with disorders involving aggression such as antisocial personality, whereas the preoccupied classification has been most strongly associated with disorders involving hypervigilence to threat

cues, such as anxiety and borderline personality. Among those diagnosed with mental disorders, the unresolved classification has been uniquely associated with dissociative disorders and also is more associated than other classifications with mental illness overall. "Cannot classify" has been found most commonly within samples involving abuse and criminal behavior. Although individuals diagnosed with mental illness typically have AAI transcripts classified as insecure, it is important to note that among individuals with transcripts classified as insecure, most are not diagnosed with mental illness.

DEBATES AND CURRENT TRENDS IN THE STUDY OF ATTACHMENT

Attachment theory and its methods for assessing individual differences have generated heated debates. For example, critics have directly questioned the validity of the Ainsworth strange situation as an index of the parent-child relationship. One branch of this debate suggests that the procedure is more stressful for some infants than others, based on their different kinds of experiences with separations. This debate grew out of early findings suggesting that infants in a Japanese sample were more likely to be judged ambivalent-resistant than infants in American samples, infants in a North German sample were more likely to be judged avoidant than infants in American samples, and infants in an American day care sample were more likely to be judged avoidant than infants in American home-reared samples. However, samples drawn from cultures as diverse as the United States, Germany, Japan, Israel, and West Africa have shown that there is more diversity in classifications within cultures than between cultures. Specifically, in middle-class samples worldwide, most infants are typically classified as secure, whereas in poverty and abuse samples worldwide, most infants are typically classified as insecure. The specific organized form of insecurity, not whether or not one is secure, is thought to be influenced by cultural practices related to separations and independence. Furthermore, an ongoing multisite American study has revealed that children in day care are as likely to be secure as their home-reared counterparts when that care is of high quality, and that maternal sensitivity in the home is the strongest predictor of their security.

A second branch of this debate suggests that strange situation classification is driven by temperament, not by a history of interactions with caregivers. However, although biological temperament is manifest in the amount of distress experienced by an infant during the strange situation, this distress is unrelated to the child's response to reunion with the parent. In addition, an infant may demonstrate a different attachment pattern with each parent; an infant's pattern can be predicted before the child is even born based on the mother's AAI; a foster child's attachment pattern can be predicted by the AAI of a foster mother who is genetically unrelated; and a recent behavioral genetics study of 800 dyads has shown no connection between temperament and strange situation classification. Although temperament does not appear to have direct effects on strange situation classification itself, studies do indicate that it may influence the relationship indirectly when a difficult temperament in the infant is combined with a mother who has low social support and is thus unable to respond to the infant in a consistently sensitive manner.

In addition to critiques of attachment methods, many researchers and members of the general population have raised concerns about basic premises of attachment theory. Because the theory emphasizes the importance of early experiences with specific caregivers and warns of the dangers of separations, many people have been concerned that attachment theory chains women to their homes, blames parents for negative outcomes in their children, and is fatalistic in its emphasis on early development. However, these concerns are based on a misrepresentation of attachment theory. Because attachment security develops through interactions within relationships, primary caregivers need not be mothers, nor even biological parents. Furthermore, attachment theorists emphasize that one's representations of attachment are constantly updated and can—and should—change over time to adapt to new circumstances.

It is this aspect of attachment theory that represents one of the most exciting frontiers of current research in the field. For example, long-term longitudinal studies following individuals from infancy through young adulthood have begun to emerge, and results have begun to suggest that attachment patterns reflect both continuity and lawful discontinuity. Specifically, in some studies, individuals who were assessed as secure in both infancy and adulthood typically experienced ongoing supportive relationships with parents, those who were insecure at both points experienced ongoing unsupportive relationships, and those who moved from security to insecurity typically experienced intervening

losses and traumas. A related trend in attachment research is the investigation of individuals who begin life in insecure relationships and have harsh childhoods yet emerge as secure-autonomous adults—a phenomenon termed earned security. Potential contributors to earned secure status currently being investigated include supportive relationships outside the family, metacognitive abilities, and forgiveness.

Other current trends in the study of attachment include preventive and treatment interventions to foster security within dyads at risk for insecurity. In addition, clinicians have been using the AAI within a treatment context, for example, administering the AAI before and after treatment or administering adaptations of the interview that index state of mind with respect to the therapist-client relationship. Also at the frontier of attachment research are studies investigating biological processes, including the roles of stress hormones, brain structures, brain activation, and genes. Other studies are focusing on behavioral and representational correlates of the AAI, including its utility for predicting behavior in romantic relationships, responses to subliminally presented threat stimuli, and the processing of information related to threat and distress. Further research seeks to bridge the developmental literature on attachment with the self-report literature on "romantic attachment style" popular in social psychology. All of these studies will contribute to the growth of a theory that has remained strong for more than 50 years.

—Kirsten M. Blount-Matthews and Matthew J. Hertenstein

See also Ainsworth, Mary Salter; Bowlby, John; Separation Anxiety; Strange Situation

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ATTENTION

Attention is what helps us to maintain perception, thought, and behavior despite distraction. There are many varieties of attention, each with a different purpose and dependent on different brain mechanisms in order to function. Attention can be separated into three main categories: selection, vigilance, and control. There are many theories regarding the mechanisms of different types of attention.

We are exposed to more sensory stimulation at one time than we can process fully. Without attention, we would be unable to sift through it all to process what we must and disregard what is irrelevant. Different sensory impressions compete with each other for our attention. Selection is the mechanism by which the brain's resources are directed toward the processing of relevant information and away from irrelevant distracting information, and in this way, the competition between different sensory stimuli is resolved. There are two main types of selective attention: exogenous and endogenous attention.

Exogenous attention refers to attention that is reflexively drawn by the sensory events themselves. For instance, if you hear an unexpected noise or see a flash of light in the corner of your eye, that draws your attention to investigate what just happened. This form

of attention is not conscious, that is, you do not plan to move your attention to the location of the unexpected flash or noise—it happens automatically. Endogenous attention is initiated by your conscious desire to gain more information about something in your environment. For example, looking for a friend in a crowded airport involves moving your attention between faces until your friend is seen. Another example is listening to a conversation in the midst of a crowded party. In this case, you attend to the voice of a single person while filtering out other voices and irrelevant noises. Divided attention is another example of selective attention, but one that requires you to maintain your focus on more than one thing at a time. For instance, while driving, you must balance your attention between monitoring your own steering and speed, while also watching for other vehicles, traffic signals, and hazards such as pedestrians. Adding other tasks to these puts further demands on your attentional system, such as talking to a passenger or on a cell phone, and the chances of having an accident are increased.

Vigilance, or *sustained attention,* is the act of maintaining attention on one thing for a length of time without losing focus. As you read this passage, if you are unable to disregard noises and other distractions, then you may not be able to finish the task. A loss of vigilance can also have more severe consequences. Air-traffic controllers must watch their screens for long hours and quickly detect and respond to signs of danger even when fatigued. Driving a car also involves vigilance. Vigilance involves a number of brain regions, including right frontal and parietal cortex and the dorsal anterior cingulate cortex. Dorsal anterior cingulate is involved in resolving response conflict, such as happens when you are trying to pay attention to something and resist distraction.

Attentional control, or *executive function,* is the process by which the higher levels of your brain direct the activity of lower levels. There are many forms of attentional control. Planning involves organizing a sequence of behaviors to achieve a goal. Prospective memory involves remembering to do tasks at a specific time, such as paying bills.

There are many theories of attention. Norman's theory of selective attention states that all stimuli, whether relevant or irrelevant, are simultaneously comprehended to some degree. However, only those events that hold the greatest amount of meaningful information are given close attention, with competition between stimuli based on both "bottom-up," or sensory-driven, and "top-down," or conscious, processes. Broadbent's filter theory is based on the assumption that human information processing has a finite capacity. This filter permits only a limited amount of sensory information to be processed at any one time. This means that if too much information arrives simultaneously, some of the information is placed on hold or rejected. Posner postulates that attention can be divided into three functions: disengagement, shifting, and engagement of attention. These functions are mediated in turn by three core structures: the posterior parietal lobe, superior colliculus, and pulvinar, respectively.

Babies begin their lives primarily with reflexive exogenous attention and develop other forms of attention as they mature. This parallels the development of brain areas involved in these different forms of attention. Babies have many subcortical networks nearly intact at birth or soon after (such as the colliculi and thalamus), which are involved in exogenous attention, but with immature cortical regions, especially the higher-order regions involved in vigilance and attentional control. These brain regions continue to develop well into adulthood. Thus, our attentional control may improve as we grow into adulthood because our brains are maturing. Conversely, because young children lack these brain networks, it may be impossible for them to use these forms of attention until they develop.

Many psychiatric and neurological disorders involve deficits of attention. People with attention deficit hyperactivity disorder (ADHD) demonstrate many inattentive behaviors. They may not pay attention to details, do not seem to listen, do not follow through on instructions, and do not engage in tasks that require attention, and they may make careless mistakes, have difficulty sustaining attention, have difficulty organizing, often lose things, and be easily distracted and forgetful. If these symptoms cause significant impairments for an extended period of time, then the patient is diagnosed as having ADHD. Inattention may also be combined with hyperactivity and impulsivity, although these are considered separate from symptoms of inattention. Many people grow out of these symptoms or learn to cope eventually, but most will carry them through their school years and into adulthood if not treated. The most popular treatment historically has been methylphenidate (Ritalin), which is a mild stimulant, although a number of other behavioral and pharmacological treatments have been

developed recently with fewer side effects. At present, there is some controversy regarding whether or not these inattentive behaviors occur during normal development and should be allowed to persist, or whether they are evidence of a true disorder that needs to be treated aggressively at a young age. A number of other psychiatric disorders also include deficits of attention. Two primary features of schizophrenia include the inability to filter out unwanted stimuli, and the inability to control thoughts and behavior. In fact, schizophrenia may arise in part as a reaction by the patient being overstimulated, owing to a lack of attentional filtering and control. Autism and Asperger's syndromes may also involve a deficit of attention, in which affected people are unable to reduce excessive stimulation and become uncomfortable with situations that others normally find pleasurable, such as close human contact. Obsessive-compulsive disorder (OCD) is another disorder that may involve deficits in attention. Individuals with OCD can have recurrent intrusive and inappropriate thoughts that they cannot suppress and that cause distress. This can be thought of in part as a disorder of attentional control because it involves the inability to control one's own thoughts. Other brain disorders, such as Alzheimer's disease, Parkinson's disease, and Huntington's disease, all involve some deficits of attention.

A number of attentional disorders can occur with damage to specific brain regions. Left hemifield neglect occurs after right parietal lobe injury. Patients with severe left hemifield neglect are completely unable to attend to stimuli in the left visual field. For instance, when asked to draw a picture of a house, they may only draw the right side of the house, leaving the left side empty. Vigilance and attentional control can also be disrupted by damage to the frontal and parietal lobes. Patients with damage to the frontal cortex often appear normal for the most part, but have severe difficulty organizing their behavior and planning for the future.

Attention is something we are born with and that develops naturally over our lifetime. Impairments of attention associated with conditions resulting from brain damage, developmental disorders, or other means can lead to severe deficits in behavior. Some forms of attentional deficits may be improved with drug treatment, such as in ADHD, whereas other forms of attention may be improved with training, such as meditation. Further research may lead to a better understanding of the brain mechanisms of attention in healthy individuals and of the causes of attentional disorders, which may ultimately lead to better treatments for attentional disorders.

—Vincent P. Clark

See also Attention Deficit Hyperactivity Disorder (ADHD)

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ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

Attention deficit hyperactivity disorder (ADHD) is one of the most common, most talked about, and most vexing of the psychiatric disorders. Symptoms of restlessness, distractibility, and poor self-control have been recognized since the mid-1800s when Heinrich Hoffman, a German physician, wrote a poem about "Fidgety Phil." Over time, the disorder has been seen as a manifestation of brain damage, "brattiness," and poor parenting. Diagnostic manuals have focused on the high level of physical activity, later on the short attention span, and more recently on the inadequate self-control features of the disorder. Few disorders have been surrounded by the controversy about assessment, treatment, and even its very existence!

DESCRIPTION

The primary features of ADHD are inattention, hyperactivity, and impulsivity. People with ADHD are described as often failing to attend to details, giving up on a task before completion, and having organizational difficulties. Restless, impatient, and intrusive are other common descriptors. However, individuals can show different levels of these features, and therefore, different subtypes of ADHD are currently recognized (e.g., predominately combined, hyperactive-impulsive, and inattentive types). Because these symptoms are part of the human condition, some question the legitimacy of the disorder. Therefore, for a diagnosis of ADHD, symptoms must be so severe that the person has significant difficulty functioning in a variety of settings. Further, the symptoms must be consistently present for at least 6 months, with an onset in childhood. People with ADHD also experience a number of other symptoms. For example, it is often very difficult for people with ADHD to keep information "in mind" while trying to solve problems or follow directions. They may have difficulty getting started and, once under way, are likely to lose interest or energy to finish the project. Emotional control is often lacking, and intense, but usually brief, emotional outbursts are common. Those with ADHD may have difficulty keeping things to themselves and are excessively talkative. The ability to think of alternative solutions to problems is diminished. Social problems, underachievement, and conflict with authority are common to ADHD.

CAUSES

Although there are many theories about the cause of ADHD, current thinking has suggested that ADHD is the result of multiple biological processes. First, ADHD has a very strong tendency to run in families, at about the same rate that height does. Second, the genetics seem to lead to differences in brain anatomy (e.g., a smaller frontal area of the brain), function (e.g., underactivity in certain brain areas), and chemistry (e.g., abnormalities in amounts of neurotransmitters). Third, prenatal complications, maternal substance use, brain damage, and lead consumption increase the risk for developing ADHD. Certain psychosocial factors, such as low socioeconomic status, a chaotic environment, and poor parenting, make it more likely that one will be diagnosed with ADHD.

FREQUENCY

ADHD is a common disorder and one of the most frequent reasons for bringing a child to a professional for assessment and treatment. Although the number of people diagnosed with ADHD varies according to the methods of the study that identified them, the accepted figures are 3% to 5% in the United States. Worldwide rates of ADHD range from 3% in the Netherlands to 20% in the Ukraine. Thus, the data are overwhelming that ADHD exists across cultures. More boys than girls are diagnosed with ADHD, with the ratios again varying according to method and ranging from 2:1 (in community-based investigations) to 6:1 (from clinic referrals). Although there has been recent debate about differences in the presentation of ADHD between genders, it appears that males and females with ADHD show about the same symptoms,

with roughly the same onset, with similar co-occurrence of other disorders, and with the same potential for impairment.

DEVELOPMENTAL COURSE

The conventional wisdom about ADHD was that it was a disorder of childhood and would be grown out of. We now know that ADHD is a chronic disorder that persists across the life span. When research takes into account the decrease in hyperactivity and impulsivity symptoms that occur with age, 40% to 80% of ADHD children grow into adulthood with at least some impairment in functioning. The appearance of adult ADHD differs from childhood, and most adults who seek treatment for ADHD complain of inattention, forgetfulness, problems focusing, and organizational difficulties. ADHD places adults at risk for relationship problems, job dissatisfaction, traffic accidents, underachievement, and health problems.

The co-occurrence of other disorders is the rule with ADHD. The disorder has a strong association with other disruptive behaviors, and between 35% and 60% of referred children demonstrate defiance, conduct problems, and aggression. Fewer adults (12%–21%) persist in these antisocial behaviors. Anxiety disorders frequently occur along with ADHD and may be even more common with ADHD adults (25%–50%). Twenty to 30% of people with ADHD may also have a mood disorder. It is not surprising that children with ADHD have difficulties in the academic setting. Disorders of learning are commonly found in children with ADHD (10%–50%). Compared with others, children with ADHD, as a group, score slightly lower on intelligence tests and are more likely to repeat a grade, be suspended, and drop out of high school. There is some controversy about the risk that ADHD poses for future substance abuse. One in every two or three adults with ADHD has a problem with alcohol abuse. Although most studies have attributed the increased frequency of substance abuse to the other disorders (particularly conduct problems) co-occurring with ADHD, a recent study has suggested that ADHD carries its own risk, independent of other conditions.

ASSESSMENT

The assessment of ADHD is a complex process. Given the controversy about ADHD, it is important that those assessing the disorder use professionally accepted, rigorously researched diagnostic criteria. Further, information should be gathered from a variety of sources, across numerous settings, using diverse methods. First, a medical examination should be conducted to ensure that the behavioral disturbances are not caused by any of a variety of medical conditions (e.g., thyroid disorder, medication, seizure disorder, sensory deficits, genetic syndromes). Next, interviews with the family and important others will cover family history, development, medical history, school performance, work history, current stressors, a detailed description of the symptoms, and the steps that have been taken to resolve them. Questionnaires, some with a narrow focus on ADHD symptoms and some with a broad view of other behaviors, are used to make normative comparisons and rule out alternative disorders. Formal testing can include computerized measures of attention and self-control and tests of memory, problem solving, decision making, and mental efficiency. At times, there may be questions that can be answered by tests of intelligence, academic achievement, or language proficiency. The clinician then assimilates all the information in order to answer the family's questions, including making a diagnosis, if appropriate.

TREATMENT

In addition to the more traditional treatment approaches, such as medication, behavior management, and classroom or workplace accommodation, there has been much recent interest in alternative treatments such as natural remedies, biofeedback, and dietary supplements. The most effective treatment for ADHD is also the most controversial. Psychostimulant medications, and newer nonstimulants, enhance the effectiveness of specific neurotransmitters and, theoretically, increase activity in the areas of the brain that regulate behavior and attention. The clinical effects of medication include improved concentration, reduced random activity, enhanced self-control, greater academic productivity, and less frequently, reduced oppositional and aggressive behavior. Medication is effective in about 70% to 80% of children and 60% to 80% of adults. The most common side effects of these medications are reduced appetite, headache, and sleep disturbance. Long-term studies have shown that concerns about growth retardation are exaggerated and that there is no increased risk for later substance abuse as a result of the use of medication.

Nonetheless, some parents are strongly opposed to using medication with their children.

The use of behavior management strategies is also very common. The approaches that are most effective are those that address the problems with behavioral regulation. A frequent approach is to provide extra reminders, guidelines, and feedback in order to have rules and expectations that have a greater impact on behavior. This might involve making a list of chores or assignments, posting it in prominent places, and providing frequent and meaningful consequences for efforts that are directed toward the completion of the assignment. Points or tokens are often used to provide immediate feedback and can later be redeemed for rewards. To retain their effectiveness, consequences may need to be more powerful and varied than those used with other children. Intervention should take place when and where the desired behavior is to occur, thus compensating for the individual's difficulties in reflecting on past behavior and thinking ahead.

School environments are often difficult for children with ADHD because the academic demands emphasize their weaknesses. Teachers and parents will often make informal accommodations that support the child with ADHD. For example, these children may be granted alterations in their curricula, take tests in alternate sites that reduce distractions, use daily report cards, have more time to complete assignments, or use assistive technology, such as computers or recorders. At times, formal procedures will establish goals and teaching methods, with accommodations, by which they will be accomplished.

Alternative treatments have received much interest but little in the way of scientific support. Diets and dietary supplements have not been shown to be effective, and the side effects of many herbal remedies remain unknown. Biofeedback, the use of sensitive equipment to monitor subtle changes in the body's activities, has been suggested as a method to alter brainwaves and reduce ADHD symptoms. The claims of biofeedback advocates have yet to meet scientific standards that would demonstrate its effectiveness, long-term effects, or competitive cost.

—John L. Barton

See also Attention, Attention Span, Ritalin

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ATTENTION SPAN

Attention is a component of higher cortical cognitive functioning and refers to a person's ability to (a) detect and focus on general environmental stimuli, and (b) select important environmental stimuli. Once an important stimulus is selected, its relevant or important characteristics must be identified while irrelevant competing stimuli are ignored. To "pay attention," the individual must be able to employ and integrate a combination of visual, visual-motor, language, auditory, kinesthetic, and perceptual motor skills (these are the functional domains). The successful individual will use his or her attention skills to respond effectively to environmental stimuli and cues. Appropriate application of those skills means that the individual is able to make suitable adaptations to those cues, which allows the individual to engage in responses that optimize positive outcomes and minimize negative outcomes.

The ability to focus and sustain attention is normally developed by age 10 years. Youth who experience deficits in one or more of the functional domains or experience delayed maturation in the integration of those domains will most likely experience problems with attention. By age 13, youth have effective attention skills. However, their ability to maintain alertness and awareness, detect novel stimuli, discriminate between various intensities of the properties of a stimulus, recognize changes in stimuli, and sustain attention improves through the maturation process to

adulthood. Attention skills begin to decline in older adults (after 60 years) as they attempt to manage multiple important stimuli.

ETIOLOGY

Researchers do not know the exact causes of specific attention deficits. The identified causes are diverse and complex and stem from multiple factors, including the following:

1. Damage to the developing brain can occur as a part of heredity, including genetic factors, neuroanatomy, neurotransmitters, and the association between neurological and familial-hereditary factors.

2. Damage can also occur during pregnancy, during birth, or at any stage of maturation of the developing brain (e.g., errors in fetal brain development; tobacco, alcohol, and other drug use, such as cocaine or crack cocaine; complications during pregnancy or delivery; toxins in the child's environment, such as cadmium; subtle disturbances in brain structures and functions; and difficulties in bringing together information from various brain regions).

3. Postnatal exposure to toxins in the environment, chemotherapy or radiation therapy, or deficits in the maturation of visual or perceptual motor skills may impair attention skills.

4. Multiple psychosocial factors can also impair attention skills, including depression and trauma (e.g., exposure to natural disasters, severe physical or mental neglect or abuse, parental violence or conflict, rape, sexual molestation, the violence of war).

ROLE OF ATTENTION

Attention plays a significant role in the development and function of the following areas: cognitive (short- and long-term memory, comprehension), visual, auditory, language, kinesthetic, perceptual motor, and integrative-adaptive. Attention allows us to orient to conditioned responses (hearing one's name being called, seeing that name written on a paper), and it allows us to recognize danger and alert our other functional domains to prepare for action. Paying attention to a stimulus can allow kinesthetic changes, such as a change of body posture; changing direction of a gaze; changes in physiological state (e.g., brainwaves, galvanic skill responses, papillary dilation, quickened pulse); and changes in emotional responses (e.g., laughter, anger).

Some events in the environment capture our attention by causing changes in the stimuli around us. Some attention-arousing stimuli are composed of novel, complex, or shocking events in the environment (visual, auditory, or physical). A change in the physical properties or characteristics of familiar stimuli can also arouse our attention (i.e., variations in intensity, size, color, and pitch).

For example, Mary is watching the birds in a tree outside of her classroom window. The teacher says Mary's name in her regular voice. Mary does not notice or detect her name being called and continues to gaze at the birds in the tree. Mary's teacher remembers that if you want to get a person's attention, you must sometimes vary the physical properties of a familiar stimulus. Mrs. Jones changes the pitch and the volume of her voice and calls Mary's name again. This time, Mary detects the conditioned stimulus of her name being called and shifts her gaze and orients her body toward her teacher and says, "Yes, Mrs. Jones." Now that Mrs. Jones has Mary's attention, she knows that she will have to vary her teaching technique to maintain Mary's attention and compete with the stimuli outside the window.

Some theorists contend that without attention, there can be no learning. The ability to concentrate or maintain attention is crucial to the ability to learn. The variation of stimuli is crucial to prevent habituation in learning situations or in activities in which detection of errors or dangerous defects is essential. Teachers in preschool, elementary, secondary, and adult learning situations are taught to vary stimuli, change their modes of communication (slides, written materials presented using slides, articles, books, audio stories, field trips, didactic lectures using humor, enthusiasm, and response-eliciting techniques).

HOW IS ATTENTION ASSESSED?

Attention is often measured by a psychologist using several different types of testing instruments, including a mental status exam. These tests assess a person's ability to detect a specific stimulus in the presence of other similar and dissimilar stimuli. The most common methods of measuring attention involve giving the person being assessed bits of information; next, the person is asked a series of questions about that information. The person's responses to the questions will determine whether or not the person was paying attention. For example, Mr. Smith

is assessing John's ability to pay attention and identify relevant information. He gives John a brief story to read on attention and then asks him some specific question about that story. One of the test questions is: "What is attention? Give a one-sentence response."

John writes the following:

> Attention is a component of cognitive functioning and refers to a person's ability to detect and focus on general stimuli and to select important environmental stimuli.

John's response demonstrates that he paid attention to the whole question and answered it correctly. However, John might have written the following:

> Attention is a component of cognitive functioning and refers to a person's ability to detect and focus on general stimuli and to select important environmental stimuli. The successful individual will use his or her attention skills to respond effectively to environmental stimuli and cues. Appropriate application of those skills means that individual is able to make appropriate adaptations that optimize positive outcomes and minimize negative outcomes.

This answer demonstrates that Johnny did not pay attention to the whole question. He did not follow the second part of the question: "Give a one-sentence response."

SUMMARY

Attention is a component of higher cortical cognitive functioning and refers to a person's ability to detect and focus on general stimuli and to select important environmental stimuli. The ability to focus and sustain attention is normally developed by age 10 years. Attention plays a role in the development and function of the following areas: cognitive (short- and long-term memory, comprehension), visual, auditory, language, kinesthetic, perceptual motor, and integrative-adaptive. Youth who do not develop this skill may develop a range of developmental problems or disorders.

—Helen D. Pratt

See also Attention Deficit Hyperactivity Disorder (ADHD)

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ATTITUDE

The research of attitudes is probably one of the most controversial, yet fascinating, areas of psychology. Although contemporary psychologists tend to define attitudes as evaluations of people, objects, and ideas, attitude theories and research have looked at attitudes in many different ways and from several varying perspectives. The study of attitudes was already popular in the 1920s and 1930s when they were being studied and developed by well-known psychologists like Thurstone and Allport. From the mid-1950s until the early 1970s, the research of attitudes in general, and of attitude formation in particular, had been approached from several different perspectives, including behavioral, cognitive, and even psychodynamic. However, by the late 1970s and 1980s, the cognitive revolution that influenced psychology in general had a decisive effect on the study of attitudes. As a result, sociocognitive perspectives dominate

today's approaches to attitude research. One of the most widely accepted models that emerged at that time was the sociocognitive tripartite model of attitude structure, proposed by Katz and Stotland. In this model, attitudes are mainly structured by three components—cognitive, affective, and behavioral—that interact to serve as the backbone of the attitudinal model. The cognitive element encompasses all the *information* the individual has about a particular attitude object. The affective component contains the individual's *feelings and emotions.* The behavioral component consists of the overt *actions* (physical or verbal) of the subject toward the attitude object. Each of these components or dimensions is represented as an evaluative continuum that can go from the extremely negative to the extremely positive, resulting in a three-dimensional representation for any particular attitude.

This and other sociocognitive models became dominant at the time and have been very useful in explaining the structure and processes involved in attitude development. However, approaches from the sociocognitive perspective have been criticized for being unable to adequately explain attitude formation and for their lack of predictive value. They are unsuccessful in explaining the low attitude-behavior consistency dilemma and fail to integrate mediating variables such as individual differences in attitude formation, change, and expression. After the development of sociocognitive models, it was believed that attitudes were formed first by acquiring information about the attitude object, then generating an affective evaluation of it, and finally expressing this evaluation with physical or verbal behavior. Therefore, the study of the cognitive and the affective components was regarded as relevant because of their expected predictive value of the behavioral component. However, it was later discovered that the three elements do not necessarily correlate at the individual level, or are not "consistent." Wicker, for example, concluded that there was only a weak correlation between verbally expressed beliefs and actual behavior. The tripartite model, although not entirely refuted, was vigorously attacked. There was great disappointment, and for a while the study of attitudes fell into abandonment.

It was not long, however, before other researchers realized that the problem was that "mediating factors" intervened in the transfer from the belief (cognition) to the emotion or feeling (affection) to the actual manifestation (behavior) of a particular attitude. For example, Triandis found 40 different social factors influencing the relationship between cognition, affect, and behavior. Still, not all the lack of consistency could be explained by social factors. Some factors had to be intrinsic to the individual. Therefore, some attempts were made to revise the tripartite model while integrating individual factors in the attitude process. Ajzen and Fishbein proposed in their *theory of reasoned action* that the interaction between beliefs, feelings, and behavior were mediated by intention, whereas Zajonk proposed that the weak relation between attitude and behavior could be explained because, for some individuals, it was possible to have an affective response for an object without the need for a cognitive-evaluative process.

Today, the revised tripartite model is again considered the basis for attitude research not only because it is the most consistent but also because it is the one the empirical evidence most supported. Furthermore, new evidence supports the cognitive-affective-behavioral models when controlled for different situational variables.

For example, Eagly and Chaiken proposed a composite model that includes several new variables, such as habit as both an antecedent and a determinant for behavior and individual factors such as self-identity as moderators of attitudes. They further differentiate between attitudes toward objects and attitudes toward behaviors.

In another example, the *theory of planned behavior,* developed by Ajzen and others, proposes that attitudes and traits do have predictive value when, in interaction, they are viewed through the "principle of aggregation": multiple aggregated patterns instead of individual instances of attitude should be the unit of analysis. Meanwhile, these attitude-behavior dyads have to be controlled primarily for four groups of "moderating variables":

1. Secondary characteristics of the disposition
2. Circumstances surrounding the performance of the behavior
3. Nature of the behavior selected to represent the underlying predisposition
4. Characteristics of the individual

It is clear that the tripartite model remains the most empirically supported and popular model for the explanation of attitudes. Furthermore, even among detractors of the model, there is general consensus in

the idea that attitudes are linked to affect, cognition, and behavior. There is still disagreement, however, on whether these three factors are structural components of attitudes, as Katz and Stotland and Rosenberg and Hovland first proposed; evaluative responses, as Fishbein and Ajzen and Eagly and Chaiken thought; or processes, as Zanna and Rempel, Eiser, and Petty and Wegener believe. Most researchers, however, even those who do not concur with a process-like view of the tripartite model, agree that during attitude formation, there are cognitive processes, from the perception of the attitude object to storage and analysis of information about it, affective-evaluative processes, and of course, motor and verbal processes involved in the expression of the attitude.

—Moises F. Salinas

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ATTRIBUTION THEORY

Attribution theory is a prominent and widely researched theory of motivation that was developed by Bernard Weiner and colleagues from the University of California, Los Angeles, in the 1970s and 1980s. The focal point of attribution theory is the general human tendency to ask "why" an outcome occurred, especially outcomes that are negative, unusual, or unexpected. For example, imagine a third grader who gets an F on a spelling test. According to attribution theory, the student would then implicitly or explicitly ask: "Why did I fail this test?" Depending on his or her performance on previous tests and the performance of classmates, the student might variously perceive that the poor grade was due to poor preparation, to bad luck, to the teacher not liking him, or, most disastrously, to his own low academic ability. Although any number of attributions can be enlisted to explain achievement outcomes, ability and effort appear to be the most dominant. In Western cultures at least, individuals attach the most importance to their perceived competencies and how hard they tried. That is, when students succeed, they often say, "I worked hard" or "I am smart." And if they fail, they are likely to conclude, "I didn't work hard" or "I am not very smart."

DIMENSIONAL THEORY

Because there are so many possible causes of success and failure in so many different domains, attribution theory has focused on the underlying properties of causes, which are labeled *causal dimensions.* Weiner defines three primary dimensions: locus of causality, stability, and controllability. Locus refers to the location of a cause, either internal or external to the subject; stability describes whether the cause is permanent (stable) or temporary (unstable); and controllability reflects whether the cause can be regulated by the individual. For example, low ability (aptitude) as a cause of failure is typically perceived as internal to the person, stable over time, and uncontrollable. Lack of effort, in contrast, is also internal, but more often perceived as unstable and controllable. That is, effort can fluctuate from situation to situation, and people have control over how hard they try. Among the other prominent attributions for failure, task difficulty is external, stable, and uncontrollable and bad luck is external, unstable, and uncontrollable.

CONSEQUENCES OF CAUSAL ASCRIPTIONS

Each dimension of causality relates to certain psychological consequences. The locus dimension relates to self-esteem and pride. When subjects make internal attributions after failure experiences, they tend to experience decreased self-esteem, but when they make internal attributions after success experiences, they feel greater pride and self-esteem. Because pride and self-esteem have been shown to foster achievement strivings, internal causal ascriptions are desirable and generally motivating following success experiences.

The dimension of stability influences expectancy of future success. When individuals experience success and attribute the cause of their success to stable factors such as ability, they are likely to expect future success, but when they encounter failure and make similar stable attributions, they perceive that future success is unlikely or impossible. Making unstable causal attributions in the face of failure (e.g., "this happened because of bad luck or poor effort") has been shown to increase subject persistence.

The dimension of controllability relates to emotions such as anger, guilt, pity, and shame. Individuals tend to experience anger when success is thwarted owing to factors controllable by others, and guilt when failure seems due to internal controllable causes such as lack of effort or neglectfulness. Pity is felt when the failure experiences of others are perceived as caused by uncontrollable factors (e.g., lack of ability or handicap), and shame or embarrassment is felt when failure seems due to internal uncontrollable causes such as low ability. When guilt is experienced, goal-directed activity is increased, but shame tends to lead to task withdrawal.

APPLICATIONS OF THE THEORY

Self-Serving Bias

Individuals constantly make attributions in their efforts to understand their environment. Yet even the most competent people are not immune to biases or errors in the way that they perceive their causal world. One such error, labeled the self-serving bias, is the tendency to take credit for success but blame others for failure. For example, when a fan returns from a sporting event and a friend inquires, "How was the game?" the person is likely to respond, "*We* won," which linguistically evidences a measure of personal triumph for the winning team's accomplishment, or "*They* lost," which squarely places external blame on the losing team's defeat. Similarly, parents of children with academic problems tend to provide external explanations for their children's difficulties (e.g., the teachers are inadequate, the curriculum is subpar), but parents of gifted children tend to claim personal responsibility (e.g., their good genetic contribution, use of effective child-rearing techniques). Self-serving biases are often adaptive and are correlated with good mental health. They can become dysfunctional when they lead to poor interpersonal relations, ineffective problem solving, or undue hostility toward others. For example, one of the precursors of child and spousal abuse is a low threshold for blaming family members for negative events.

In Teaching

Many studies have substantiated a strong locus–esteem relationship. Investigators, for instance, have found that teachers tend to take the credit when their students perform well by making ego-enhancing attributions, but assign blame to students when they perform poorly by making ego-defensive attributions. By blaming student failure on external causes, such as poor home environment, teachers "save face" and protect their self-images. Interestingly, effective teachers tend to view student learning difficulties and behavior problems as unstable, or temporary, and thus amenable to intervention. When teachers see student failure as potentially avoidable through personal intervention, expectancy for future student improvement is enhanced and teacher persistence is increased. Some have even suggested that teachers' attributions should be assessed as part of the teacher selection process.

The dimension of controllability has been shown to be associated with certain teacher emotions and behavior intentions. Teachers are most likely to reward students when success is seen as a result of effort, a controllable cause, whereas teachers tend to exhibit more anger, rejection, and punishment when failure is seen as resulting from lack of effort. Teachers are less committed to helping students when they perceive problem causality to be controllable by the students. Teachers' emotions and messages have also (sometimes paradoxically) been shown to act as ability cues to students. For example, when a teacher expresses pity to a child who does poorly on a test, the student is more likely to think that the teacher believes the student to possess low ability, but if the teacher expresses anger to the student, the student is more likely to internalize a high-ability message: That if the student had tried harder or studied more, they could have been more successful.

Attribution Retraining Programs

Attribution theory is guided by the belief that causal thoughts (e.g., "Why did I fail?") guide feelings and behavior. Therefore, changing maladaptive

causal thoughts to more adaptive causal beliefs should result in improvements in achievement-related feelings and behaviors. That line of reasoning has been the basis of a program of intervention research known as *attribution retraining.* Most of the studies have focused on teaching students to attribute their failures to unstable causes that are within their control (e.g., low effort) rather than stable causes that also are uncontrollable (e.g., low ability). Attribution retraining programs have been implemented with both children and college-age students and have proved quite successful. Retrained students have reported more attributions to poor effort than to low ability when they encountered failure, higher expectations for future success, and more persistence in the fact of challenging tasks. Although the research has focused on the change from low ability to lack of effort, any failure attribution that is both unstable and controllable would be adaptive. Furthermore, attribution retraining might also be appropriate for success. Some students have benefited from being trained to attribute their success to internal and stable causes rather than external and unstable causes such as unusual help from others or good luck.

In Peer Relations

Although attribution theory has primarily been applied to academic achievement outcomes, it also has been very useful in the study of social success and failure. In the domain of peer relations, for example, students also ask "why" they have no friends or are the targets of others' harassment. As in the achievement domain, moreover, some kinds of attributions for social failure might be particularly maladaptive. It has been documented that when victims of peer harassment attribute their plight to internal, stable, and uncontrollable causes, they feel more depressed, lonely, and anxious than if they attributed their harassment to external or unstable factors, such as being in the wrong place at the wrong time. It is evident that victims of peer harassment cope much better if they do not blame themselves for those negative social experiences.

Attributional Style

Attribution theory concentrates on the situation under study—a person might endorse one type of attribution in achievement situations but another type when they confront social dilemmas or health challenges. However, some people appear to have a general propensity to explain good and bad events in a particular way. That propensity has been defined as *attributional style,* which allows people to be classified as either pessimists or optimists. People who explain negative outcomes as internal ("it's me"), stable ('things will always be that way"), and global ("it affects many areas of my life") are judged to have a pessimistic attributional style. In contrast, those who typically attribute negative events to external, unstable, and specific events are considered to have an optimistic attributional style. Attributions for good events can also be considered pessimistic (external, unstable, specific) or optimistic (internal, stable, global). Research on attributional style has shown that optimists do better in school, enjoy greater work productivity, and have better long-term health.

FUTURE DIRECTIONS AND CONCLUSION

Attribution research has documented how individuals' causal ascriptions affect their emotions, motivation, and behavior in a variety of subtle and powerful ways. Most importantly, the model has provided researchers, educational psychologists, sociologists, consumer analysts, and medical professionals with a framework to describe and understand why individuals are motivated to exert effort (or avoid tasks) in a wide variety of contexts. Studies related to causal attributions and human behavior offer an array of implications for parents, students, teachers, school leaders, and employers.

—Lynn Melby Gordon and Sandra Graham

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AUTHORITARIAN PARENTING STYLE

Authoritarian style is one of the three original parenting styles Diana Baumrind recognized. In describing parenting styles, Baumrind identified two dimensions of parenting. The first relates to how demanding parents are. This element speaks to parents' levels of strictness or supervision. The other dimension Baumrind acknowledged relates to how responsive parents are. In other words, highly responsive parents are ones who are accepting of and warm toward their children.

Parents who are strict and demanding yet rarely accepting and responsive are categorized as having an authoritarian parenting style. These parents often lack flexibility and offer less give-and-take or compromising with their children. On the opposite end of the spectrum is permissive parenting style, which incorporates a highly accepting technique but also lacks supervision. Authoritarian and permissive parenting styles generally are less desirable than authoritative parenting style, which utilizes a warm but firm technique in parent–child relationships. Although Baumrind initially described only three parenting styles, some literature describes a fourth commonly recognized style labeled *neglectful.* Neglectful parents are those who provide neither supervision nor acceptance.

Authoritarian parents tend to expect and value obedience. They have clear and rigid rules designed to limit their children's freedom. They do not tolerate defiance, and they may employ strict punishment for rule breaking. Instead of teaching their children to make logical decisions, they teach their children to do what they say. In a sense, they want their children to be blank slates.

Although authoritarian parenting often elicits obedience from young children, research shows that several less desirable outcomes can occur when the children reach adolescence. For example, adolescents of authoritarian parents might be anxious and withdrawn because of the fear of their parents. Girls might become overly dependent on others, whereas boys might react aggressively to others. To express dislike of authoritarian parenting style, these adolescents may also enter a period of rebellion in which they learn to believe misbehavior is not wrong as long as their parents do not find out about it. This strategy hinders communication between the parents and children and undermines the importance of moral reasoning.

However, although the authoritarian parenting style paves a road to some undesirable outcomes, other correlates of authoritarian parenting style are constructive. Studies show that children of authoritarian parents have lower levels of drug or alcohol abuse than do children of permissive or neglectful parents. In addition, these children usually do fairly well academically in their later school years. This case is especially true for children from Asian American families, which tend to adopt a more authoritarian style and also tend to have high regard for academic excellence. Nonetheless, with the exception of Asian American adolescents from authoritarian homes, academic performance of adolescents in authoritarian homes usually falls a bit short of the scholastic achievement of adolescents in authoritative homes. Authoritarian parenting styles can be, but are not always, the most advantageous for the scholastic realm.

Although authoritarian parenting style has the ability to engender both positive and negative outcomes for children, research indicates that authoritative parenting is the most beneficial style for the welfare of children and for achieving rewarding parent-child relationships. This indication is especially true in societies that value change and independence. Authoritarian parenting styles work best in societies such as agrarian-industrial societies that place value on accepting one mapped-out way of achieving goals.

SUMMARY

Some studies have argued that parenting style influences children's levels of happiness, assertiveness, independence, and aggression even more than attachment style. Clearly, parenting style has an instrumental role in children's development. Individuals' parenting styles often resemble their personalities and therefore typically remain in the same category over time. However, if parents are aware of the positive effects of practicing a combination of warmth and firmness, they might be more inclined to attempt incorporating some authoritative techniques into their parenting styles and therefore increase the likelihood of healthy development for their children.

—Kristin L. Rasmussen

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AUTHORITATIVE PARENTING STYLE

"Parenting styles" are simply one way to think about and classify the many differences from family to family in how parents go about rearing their children. Diana Baumrind, in the early 1970s, formulated a categorization scheme for parenting that is still used today. One's parenting style is determined by an analysis of where along a continuum of two parenting dimensions a person falls: warmth and control. Warmth is the degree to which parents are understanding, compassionate, and responsive to their children's physiological and psychological needs. Control is the degree to which parents are involved in regulating children's behavior through the provision of goals, expectations, behavioral standards or rules, and discipline-authority. Parenting that incorporates a high level of control with a low level of warmth is labeled *authoritarian parenting.* Parenting characterized by high level of warmth and low level of control is labeled *permissive parenting.* Although each of these two styles has strong points, Baumrind believed that the parenting style that facilitates most optimal child development incorporates high levels of warmth as well as relatively high levels of control. She labeled this style *authoritative parenting.*

Authoritative parents are supportive and affectionate with their children. They listen to their child's point of view and encourage their child to be appropriately independent and autonomous in the physical and social world. Authoritative parents are clear about what types of behavior are acceptable and not. They reason with their children and, when providing discipline, attempt to convey an understanding of why behavior is inappropriate. Discipline, for these parents, is less about punishment and more about the child learning from mistakes. As a child matures, authoritative parents allow for greater independence while at the same time requiring children to take on greater responsibilities.

Although this entry discusses parenting in terms of categories or types, parents labeled as authoritative are not necessarily authoritative all of the time—there is certainly variability in parenting depending on the situation, but this situational variability is centered on an "on-average" authoritative style. Different children can also elicit different parenting practices. The parent-child dynamic is highly transactional, such that the parent influences the child and the child influences the parent. One style might work best with a certain child, whereas a different style might work for another.

A wealth of research has shown that authoritative parenting is linked with generally positive outcomes for children, especially within middle-class, white families in the United States. Children raised in an authoritative manner are more likely to be socially competent. These children tend to be well liked and cooperative with their peers, have high self-esteem, and show empathy toward others. These children, on average, show relatively few behavior problems at home and school. Authoritative parenting is also linked to greater academic achievement on the part of the child when compared with the other parenting styles. Authoritative parents tend to have expectations for, and place certain demands on, their children, and together with strong parental support and encouragement for achievement, this parenting style appears to drive children to succeed.

During adolescence, the impact of authoritative parenting remains visible. Authoritative parents tend to be the most effective at conveying their personal, religious, and moral values to their children. Children of authoritative parents also show improved behavioral self-regulation skills compared with children reared with different styles, meaning that they tend to be less impulsive, resist temptation better, and engage in fewer at-risk behaviors, such as drug and alcohol

use and sexual promiscuity. It is important to note that this style of parenting can be difficult to maintain because it entails continuous interest, responsiveness, and involvement in children's lives.

—Beau Abar and Adam Winsler

See also Parenting

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AUTISM

Many are familiar with Dustin Hoffman's portrayal of a man with autism in the movie *Rainman.* We laughed as he repeatedly stated that he only buys his underwear at K-mart and were amazed that he could count the number of toothpicks on the floor with a single glance. Yet, we were mystified that he did not know the cost of a candy bar, how to converse with another person, or how to stop hitting himself when he was upset. Rainman did not pick up on the social nuances of everyday life and often had difficulty effectively communicating his wants and needs. He perseverated on topics that were often not of interest to others and had some unusual and repetitive behaviors. Rainman had autism.

WHAT IS AUTISM?

Autism, one of several pervasive developmental disorders (others include Asperger's syndrome, pervasive developmental disorder not otherwise specified, Rett's disorder, and childhood disintegrative disorder), is a lifelong neurological disability that affects how the brain functions. It is characterized by delayed and atypical social and communication skills, as well as by the demonstration of repetitive behaviors and restricted interests, which begin before 3 years of age. To receive a diagnosis of autistic disorder, an individual must meet the criteria set forth in the *Diagnostic and Statistical Manual of Mental Disorders* (4th edition, text revision; *DSM-IV-TR*). The criteria focus on qualitative impairments in (1) social interactions (e.g., failure to develop peer relationships, a lack of sharing enjoyment with others, and poor social reciprocity), (2) communication skills (e.g., delay in language, difficulty initiating or sustaining conversations, stereotypical or repetitive use of language, lack of make-believe play), and (3) repetitive and stereotypical patterns of behavior (e.g., preoccupations, inflexibility, repetitive motor movements).

Although each individual with autism is different, some hallmark characteristics and behaviors include poor eye contact, need for sameness, fascination with parts of objects, selective listening, repeating the same thing over and over, disliking to be touched, preoccupations, rocking, sensitivity to certain textures, hand flapping, delays in communication skills, lack of pretend play, and difficulty understanding social relationships. Individuals with autism have varying levels of cognitive and language abilities, ranging from significantly delayed to above-average abilities.

The prevalence rates for autism vary. Some speculate that 1 in 3,000 people has autism; others suggest that 1 in 250 has some form of autism. The numbers of individuals diagnosed with an autism spectrum disorder have increased over the past few decades. There are numerous theories on why the prevalence rate has increased so dramatically. The increase might be due to a better understanding and acceptance of autism in society, better tools for diagnosing, and the introduction of the autism category for serving children with disabilities in the schools. Autism tends to affect more males than females, although females tend to be more impaired by the disorder than males. Autism affects individuals of all cultures and socioeconomic levels.

The etiology of autism is not clearly understood. When it was initially diagnosed by Leo Kanner in 1943, autism was believed to be the result of unloving and detached parents. As opposed to environmental contributors, autism is now believed to have a biological cause. Although the exact biological cause is unknown, autism has been linked to brain abnormalities and genetic differences on a variety of chromosomes. Recent research suggests that there is a 3% to 7% chance of recurrence of autism in siblings, including fraternal twins. There is a 60% chance that if one identical twin has autism, so will the other. Autism has also been associated with disorders such as fragile X and tuberous sclerosis. Recently, there has been

speculation that autism is caused by measles-mumps-rubella (MMR) vaccinations, vitamin deficiencies, and food allergies; however, current scientific research does not support these theories.

INTERVENTIONS FOR INDIVIDUALS WITH AUTISM

There are currently no medical tests to measure the biological markers of autism. Instead, professionals must rely on observations and reports of behavior. There are various measures available to observe and assess the social, communication, and atypical behaviors of individuals with autism (e.g., Childhood Autism Rating Scale, Autism Diagnostic Observation Schedule—Revised, Checklist for Autism in Toddlers, Autism Diagnostic Interview—Revised). Recently, new instruments have been developed to screen for and detect behaviors and characteristics associated with autism in children as young as 12 months old. Skilled clinicians using available instruments can reliably diagnose children with autism as young as 18 months. Early diagnosis is essential to ensure that appropriate interventions are provided while the brain is still developing.

Although there is not yet a cure for autism, effective treatments to decrease the associated symptoms are available. Some of the more popular interventions include using behavioral techniques, particularly applied behavior analysis (ABA). When using ABA, the antecedents and consequences of behaviors are considered to determine the function of the behavior. For example, does the child engage in the behavior in order to avoid less preferred tasks, to obtain a desired object, to gain attention, or as a means of responding to sensory overload? ABA also focuses on breaking tasks into their component parts. Skills are then systematically taught using direct instruction. Frequent, positive reinforcement is offered. This technique is particularly useful if basic skills, such as eye contact and imitation, are being taught.

Another type of intervention for individuals with autism focuses on teaching developmentally appropriate skills within typical, daily activities. These programs often utilize typically developing peers to act as models for the child with autism. Highly structured classrooms with a small teacher-to-student ratio are essential.

Medical interventions, although not a cure for autism, assist in treating symptoms, such as anxiety, inattention, and obsessive-compulsive behaviors. Medications might include tranquilizers (e.g., haloperidol [Haldol], risperidone [Risperdol]), or selective serotonin reuptake inhibitors (e.g., fluvoxamine [Luvax], fluoxetine [Prozac]). Some of the more controversial treatments for autism include special diets (e.g., gluten-casein free) or high doses of vitamins (e.g., B_6). Injections of secretin have also been attempted. These various treatments are considered controversial because there is not a research base supporting their effectiveness, particularly in young children with autism spectrum disorders. Information describing their effectiveness is based on informal data only.

In 2001, the National Research Council formed a committee to review existing literature and research on treatments for children with autism. Based on their findings, the committee put together a list of best practices for the education of children ages birth to 8 with autism. Their findings emphasize the importance of early intervention, 25 to 40 hours per week of intense intervention, one-on-one and small-group instruction to meet individual goals, and the use of planned teaching opportunities that focus on developmentally appropriate activities. Inclusion of families in the intervention processes is emphasized. The National Research Council further suggests that the priorities of intervention should focus on increasing (1) functional communication skills (using words, signing, visual supports), (2) social skills (eye contact, imitation, give-and-take of interactions, using communication skills to interact with others), (3) play skills (playing with a variety of toys, including others in play schemes), (4) cognitive development, and (5) strategies to address challenging behaviors.

CONCLUSION

Researchers are beginning to have a better understanding of the causes and treatments of autism. However, there is still so much to learn. Just as Rainman methodically looked at the world and recorded his observations, so must we if we are to make a difference in the lives of individuals with autism.

—Michal S. Nissenbaum

See also Asperger Syndrome

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AVERAGE LIFE EXPECTANCY

Life expectancy is the average number of years remaining to an individual of a specified age if the mortality conditions implied by a particular period (cross-sectional) or cohort (longitudinal) life table applied; the former projects the years remaining to all people of a given age, and the latter projects years remaining to all people born in a given year. Life expectancy is widely used as an indicator of mortality conditions because it is based on the mortality experience at all ages and is independent of age structure.

The conventional demographic notation used for life expectancy is e_x, which denotes the remaining expectation of life at age *x.* For example, e_0, e_{50}, and e_{85} refer to the average number of years remaining to people 0 (newborn), 50, and 85 years of age, respectively. Life expectancy at birth (e_0) is the most widely used value, so that where life expectancy is referred to without qualification, the value at birth is normally assumed. High levels of infant mortality may mean that those who survive this high-risk year may have higher life expectancies than the newborns themselves. The inverse of life expectancy at birth ($1/e_0$) gives the per capita death rate in a population. For example, the 80-year life expectancy at birth of contemporary U.S. females implies a per capita annual death rate of 0.0125 (1/80).

The increase in life expectancy can be illustrated by data for women in the United States as given in Table 1, which shows the range of life expectancies at birth as well as at middle and old age over a single century in the United States.

Table 1 Life Expectancy (Years) Trends in U.S. Females

	1900	*1950*	*2000*
At birth (e_0)	49.0	71.1	79.7
At 50 years (e_{50})	21.5	26.5	31.9
At 85 years (e_{85})	4.0	5.0	6.9

SOURCE: U.S. Center for Health Statistics.

Table 2 Life Expectancy (Years) at Birth in Selected Countries*

	Both Sexes	*Men*	*Women*
Kenya	45	46	44
India	64	63	65
Japan	82	78	85
Germany	78	75	81
United States	77	74	80

SOURCE: United Nations, 2004.

*Estimated by United Nations, 2000–2005. Japanese women currently experience the highest life expectancy of either sex for any country in the world.

Women enjoy life expectancies 2 to 10 years longer than men in most countries, the difference of which is referred to as the life expectancy gender gap. The life expectancy at birth in less developed countries (e.g., Kenya, India) generally is lower than in developed countries (e.g., Japan, Germany, the United States), as shown in Table 2. Japanese women currently experience the highest life expectancy of either sex for any country in the world.

Life expectancy at age 65 is important in the context of social security (Table 3) because it gives the average number of years the average individual will be expected to collect (unreduced) retirement benefits. For example, men attaining 65 in 2000 can expect to live 16.2 years, compared with 12.7 years in 1940. Thus, the increase in time that men can anticipate receiving social security in 2000 relative to 1940 is 3.5 years.

Whereas *life expectancy* at birth is a life-table measure that refers to the average number of years remaining to a newborn or the average age of death in the cohort, *median survival* refers to the ages at which half of all

Table 3 Life Expectancy (Years) at Age 65 in the United States

Year	*Men*	*Women*
1940	12.7	14.7
1960	13.2	17.4
1980	14.6	19.1
2000	16.2	19.3

SOURCE: U.S. National Center for Health Statistics.

deaths have occurred, and the *mode of survival* refers to the age corresponding to the highest frequency of deaths. For example, the *mean, median,* and *modal* ages of death for newborn U.S. females in 2000 were 80, 83, and 88 years, respectively. In every population on record, the mode of the length of life is several years higher than the mean, which is pulled down by premature (early) deaths. An additional concept that is important to understand for context is *life span,* defined in both empirical and theoretical contexts, the former as the "record age" of a species (122.5 years in humans) and the latter as the "hypothetical upper age limit of a species under a specified set of conditions."

—James R. Carey

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B

Brain Development

The brain is a wonderful organ. It starts working the moment you get up in the morning and does not stop until you get into the office.

—Robert Frost

BABBLING

Babbling is the stage of language development during which children produce speech sounds arranged in nonsensical combinations, such as "bababa," "deedeedee," or "badegubu." All normally developing children babble. Parents and family members may view babbling as an endearing but trivial behavior produced by infants; however, babbling represents a stage of language development during which the child is laying the foundation for future adult-like language production.

THE SOUNDS OF BABBLING

The first vocalizations produced by infants include crying, laughing, and cooing. When infants are between 2 and 3 months old, they begin to coo. Cooing infants produce sounds that most closely resemble the vowels a, e, and o. Cooing may be an extended single vowel as in "oooo" or "aaaa" or a complex series of vowels, "aaaeeeooo." Babbling typically begins by the 6th month. Table 1 provides a summary of the types of utterances produced by the child in the first year.

Between the 6th and 7th months, infants gain greater control of jaw movements, enabling them to produce the vowels i and u and the consonants g and k. Over time, infants begin producing the consonants m, n, p, b, and d. During this time, infants engage in vocal play. They may produce nonspeech sounds such as squealing, yelling, and growling. They may also produce *raspberries*, which are created when the tongue is extended through rounded lips and air is forced through the mouth.

Between 6 and 9 months, infants begin to combine a single consonant and vowel together in a long repetitive sequence, such as "babababababa" or "deedeedeedee." Such sequences are characteristic of *canonical babbling*. Over time, infants' babbling becomes more complex. Productions typically involve different syllables produced in the same utterance, as in "badegubu" or "deekidobu." Such sequences are characteristic of *variegated babbling.* Between the ages of 12 and 14 months, infants' babbling is likely to contain intonational contours or prosody. Infants may produce streams of speech sounds that have the melody of adult speech. It may sound as though the infant is making a statement or asking a question, even though they are not saying anything meaningful.

DEVELOPMENT OF BABBLING

There are physical changes that occur in the young infant that make babbling possible. At birth, infants'

Table 1 Types of Utterances Produced by a Child in the First Year

Age	*Type of Utterances*
Newborn	Crying
1–3 months	Cooing ("ooo," "aaa")
	Laughing
	Distinct crying to indicate hunger, anger, or discomfort
	Vocalizes in response to speech
4–6 months	Single syllables emerge ("ba," "ga")
6–8 months	Babbles with duplicated syllables ("babababa," "dadadada")
	Attempts to imitate sounds
8–12 months	Babbles with multiple syllable types ("bagadabu," "dabuga")
	Babbling is produced with sentence-like intonation

vocal structure closely resembles that of nonhuman primates, with a shorter vocal tract and a much higher larynx than adults. Before babbling can occur, the vocal tract must mature, and the infant's larynx must descend from high in the nasal passage to a lower position in the throat. During the 3 months of life before the larynx descends, infants can eat and breathe simultaneously. Before the larynx descends, infants are incapable of producing complex speech sounds, such as syllables composed of consonant-vowel combinations. Infants are capable of producing cries, clicks, groans, and sighs. After the larynx descends, infants can produce cooing sounds, such as "ooo" and "aaa." By the age of 4 months, the vocal tract more closely resembles that of adults, and babbling generally emerges. In the months following the descent of the larynx, infants' vocalizations become more and more complex.

Research has shown that 95% of infants' babbled vocalizations involve the 12 speech sounds that are most common across the world's languages: m, d, j, p, h, b, w, t, n, k, g, and y. The vocalizations babbled by all infants are strikingly similar across the world, regardless of the infants' native language. It is common for infants to produce speech sounds that are not among the speech sounds of their native language. For example, infants reared in English-speaking environments may produce non-English speech sounds, such as the click sounds that occur in certain African languages. Likewise, infants reared in Japanese-speaking environments may produce speech sounds not occurring in Japanese, such as [r]. As infants mature, more of the speech sounds produced are those speech sounds heard in the environment in the language or languages of the home, and fewer of them are speech sounds from other languages. This phenomenon has been referred to as *babbling drift.*

WHEN BABBLING IS DELAYED OR DOES NOT OCCUR

An absence or substantial delay of babbling may occur in infants born with certain medical conditions or infants with developmental disorders. For example, infants who have had a tracheotomy typically do not babble and show persistent abnormalities in their vocal patterns if their normal breathing is not restored by the second year of life.

Some infants may be unable to produce speech due to a disorder affecting the motor control system. This disorder is called *apraxia*. Infants with severe apraxia may not coo or babble and may fail to produce a first word. They may attempt to communicate by pointing and grunting. Less severe forms of apraxia may be characterized by a delay in the production of the first word. When words are produced, speech sounds that are difficult to articulate may be consistently replaced with speech sounds that are easier to articulate.

Babbling may also be delayed or completely absent in infants affected by autism. Autism is a disorder characterized by abnormal social development. Autism is typically accompanied by delays in language development and may be accompanied by mental retardation. Those with the severest forms of autism may not speak at all. Those with mild forms of autism may produce some speech, but the amount of speech that is produced is far less than that of the typical infant.

Babbling may be delayed in infants born with Down syndrome, a chromosomal abnormality that causes mental retardation. Approximately 1 in 800 infants is born with Down syndrome each year. Down syndrome children typically experience delays in language development. Down syndrome infants start the canonical babbling stage 2 months later than other infants do. However, when babbling does occur, it is similar to the babbling produced by normally developing infants. Due to abnormalities in the development

of the vocal tracts, palates, and tongues of Down syndrome children, speech production is likely to be challenging for the Down syndrome child.

Babbling occurs without a delay in infants born with hearing impairments. Each year, approximately 1 in 1,000 children is born with a severe hearing loss. The early vocalizations made by profoundly deaf infants cannot be easily distinguished from those made by hearing infants. Deaf infants will cry, coo, and begin to babble. However, deaf infants are unlikely to produce repeated consonant–vowel syllables characteristic of the canonical babbling stage. The amount of babbling and the quality of the babbling produced by deaf infants may be less than that produced by hearing infants. Deaf infants who are exposed to sign language from birth develop sign language skills in the same stages as hearing infants develop speech and listening skills. Signed languages such as American Sign Language (ASL) are unique languages, each having its own rules of grammatical structure. Deaf infants who are exposed to a signed language will produce *manual babbling*—sequences of gestures that can be viewed as language practice. Manual babbling typically emerges around 10 months. In contrast, hearing infants who are exposed to a signed language during the first year of life produce very little manual babbling.

SUMMARY

Babbling is a routine stage of language development, observed in all normally developing infants. Starting at the 6th month, infants practice the speech sounds that will later be used to form syllables, words, and sentences. Over time, the sequences that are babbled become more complex. By the end of the first year, infants have produced their first words. For infants with certain developmental disorders, babbling may be delayed or absent.

—Elaine C. Fernandez

See also Baby Talk, Language Development

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BABINSKI REFLEX

The Babinski reflex is also known as Babinski's sign or hallucal dorsiflexion reflex, and was first described by Dr. Joseph Francois Felix Babinski (1857–1932), a French neurologist. The reflex is a neuromuscular one elicited by drawing a blunt point (such as a thumbnail or the end of the handle of a reflex hammer) along the outer sole of the foot from the heel to the metatarsal pads and then toward the great toe (hallux). This should be done with light pressure; a painful stimulus is incorrect. The normal (negative) response is downward extension of the great toe and often other toes, often with extension of the ankle. Abnormal (positive) responses include upward flexion of the great toe, fanning of the toes, upward flexion of the ankle, and flexion of the knee and hip. Some or all of these may be present. This is a superficial reflex, mediated by nerves from the fourth lumbar through the first or second sacral segments and involves activation of the tibial nerve. In the absence of tibial nerve palsy, a positive response indicates dysfunction of pyramidal tract motor neurons in the cortex and subcortex, brain stem, and spinal cord.

Babinski's sign is one of a group of primitive reflexes, also known as infantile reflexes. These are present at birth but are normally suppressed by higher neural functions as growth and development proceed. The abnormal upgoing response of the toes or an absence of response may be seen in newborns and infants, but the normal response should emerge permanently by the age of 2 years. Other primitive reflexes include the snout reflex, sucking reflex, and grasp reflex, which, when seen in older children and adults, are indicative of significant cortical neurological dysfunction.

Abnormal Babinski responses may be present in meningitis, head or spinal cord injury, brain tumor, spinal tuberculosis (Potts' disease), hepatic encephalopathy, stroke, amyotrophic lateral sclerosis, multiple sclerosis, some forms of poliomyelitis, and other, less common diseases.

—Roy Parish

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BABY BOOMERS

Baby Boomers have had a tremendous impact on 20th century history and culture. Baby Boomers are defined as anyone born between 1946 and 1964. In the United States, nearly 30% of the population constitutes Boomers. The increased birthrate in the post–World War II era also impacted Canada, where the generation is known as "boomies." In Britain, Baby Boomers are simply referred to as "the bulge." Baby Boomers have left an indelible mark on the modern history of the United States.

Throughout the course of human history, the optimism or pessimism of a civilization can be measured by the birthrate. An increase in birthrate usually represents a more optimistic culture, whereas a decrease may indicate pessimism. For example, a declining birthrate contributed to the fall of the Roman Empire in 476 AD. In the modern era, a similar trend surfaced in France as the birthrate declined in the second half of the 20th century and pessimism reigned, while in the United States the rate of birth skyrocketed, signifying the rise of extreme optimism and the Baby Boomer generation. In 1940, there were about 2.5 million births in America, and by 1946 the number grew to 3.3 million births. The rate continued to rise in the United States from 1955 to 1964 as the birthrate continued to expand, and the rate never fell below 4.0 million each year.

There was good reason for optimism in the United States. Not only did the nation emerge from the Great Depression and World War II virtually unscathed, but the United States would also dominate global politics in an unprecedented fashion. In 1946, the United States constituted 6% of the world's population, yet it controlled 63% of the world's industry and 75% of the world's capital. As the American economy continued to grow in the second half of the 20th century, the Boomers were uniquely positioned to contribute to the expansionism.

The outlook of the Baby Boomers was distinctly different from either of their two predecessors, the Greatest Generation (1900–1929) and the Eisenhower Generation (1930–1945). The postwar world represented tremendous hope and opportunity, and the Boomers sought to take full advantage. The generation experienced the hope and aspirations of the New Frontier of the Kennedy Administration, the Civil Rights and Voting Rights acts, while they also encountered disillusionment in Vietnam and Watergate. The assassinations of John Kennedy, Martin Luther King, Jr., and Bobby Kennedy left a permanent mark on the usually optimistic generation. The culture, music, and attitudes of the nation were directly influenced by the Boomers. More than anything else, the group contributed sweeping changes to modern America.

The Baby Boomers were also better educated than earlier generations. This was due in large measure to the G.I. Bill. American servicemen used Franklin Roosevelt's G.I. Bill to obtain college degrees, and this benefit was also extended to Boomers. The Boomer generation was about twice as likely as their parents to be high school or college graduates and nearly 25% of the postwar group earned bachelors' or advanced degrees. The value of higher education continued as the children and grandchildren of Boomers headed to colleges and universities throughout the United States in unprecedented numbers.

Perhaps most striking of all was the impact that Baby Boomers had and continue to have on the national economy. The Boomers have the highest labor force participation of any generation in American history. Nearly 90% of the postwar generation works—over half of the entire workforce in the nation. Nearly 80% of female Boomers worked, which opened the door for tremendous opportunities. The economic prosperity of the 1990s was due in large measure to Boomers reaching their peak in both earning and spending. Baby Boomers are also less apt to marry, more apt to divorce, and have fewer children than earlier generations.

Baby Boomers have had an enormous influence on modern America. The sudden population growth impacted the nation politically, culturally, and economically. Baby Boomers have left a significant mark on the history of the United States.

—Timothy Crain

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BABY TALK

Babies learn to speak by listening to their caretakers. People help them by modulating the sounds of speech in fundamentally the same way. A topic of much speculation among researchers who study language acquisition is the observation that caretakers consistently address their infants in this unique tone and manner of voice, a form that has come to be known as "baby talk," "infant-directed speech," or motherese. Motherese is a linguistic register based on exaggeration of pronunciation and simplification of syntax. It is found in virtually every culture and has certain common characteristics: The sentences are very short, there is a lot of repetition and redundancy, there is a sing-song quality to it, and it contains many diminutive words. It is also embedded in the context of the immediate surroundings, with constant reference to things and goings-on nearby. Certainly there is a social component to this form of speech. Infants respond more positively and listen longer to infant-directed than to adult-directed speech. Furthermore, while researchers disagree over whether exposure to this type of speech is necessary for successful first language acquisition, there is general agreement that motherese contributes to the ease with which infants are able to break into their particular language of exposure.

For the language-learning infant, identifying the components that make up spoken language is a difficult task. Instances of words vary phonetically and acoustically, depending on the discursive, syntactic, and phonological contexts in which they occur. This is in addition to variations introduced by changes in, for example, talker identity and speaker affect. At the earliest stages, word recognition must be guided by features of the individual instances of words themselves. Although it remains unclear precisely which aspects of the auditory signal initiate recognition, acoustic prominence—an important characteristic of infant-directed speech—is one factor that has been considered particularly influential in jump-starting this process. Data supporting this view indicate that infants generally prefer to listen to acoustically salient speech, where "salient" can mean either effectively or emphatically so. Conveniently, the natural form of input to the language-learning child is modified in just such a way.

Infants face another difficulty when it comes to speech segmentation. In fluent speech, words are not separated by pauses, and the cues that may serve to signal word boundaries vary from language to language. Nevertheless, and despite these challenges, normally developing infants begin to succeed at recognizing words in fluent speech about midway through their first year. This has been attributed, in large part, to caretakers' tendency to repeat content words when addressing their infants. Repetition of the full form of a word is perfectly reasonable—even expected—in speech directed to infants, and this repetition is quite distinct from the reduction to pronominal form that occurs across mentions of content words in adult-directed speech. Although repetition is often cited as one of many characteristics of speech directed to infants, it is generally viewed as subordinate to the prosodic quality of such speech. While repetition appears to be an important feature in guiding speech segmentation, it is not the aspect of motherese that is most often referred to as influential in language learning. However, given the problems the language-learner faces, it may well be just as important as other aspects of this unique register.

Generally speaking, infant-directed speech involves clear and careful pronunciation, exaggerated intonation, relatively few abstract words, reference to tangible objects that a child can see and touch, and a focus on the actions the child is doing or witnessing. Not only mothers speak motherese. Anybody who communicates with young children will adopt this modified form of speech. And while it is arguably not fundamental to a child's ability to acquire language, its apparent universality points to its importance in aiding that process.

—Heather Bortfeld

See also Babbling, Language Development

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BALTIMORE LONGITUDINAL STUDY OF AGING

The Baltimore Longitudinal Study of Aging (BLSA) is a major clinical research program in human aging conducted in Baltimore by the National Institute on Aging, National Institutes of Health (NIA, NIH). The events that started the BLSA have become almost a legend in the research field of aging. In 1958, Dr. William W. Peter, an officer of the U.S. Public Health Service, decided to bequeath his body to science. An inquiry to NIH yielded the suggestion that he consult Dr. Nathan Shock, who at that time was leading a group of NIH scientists interested in understanding "the biological factors that produce what we perceive as aging" and "the mechanisms that produce impaired performance with age." Dr. Shock had become convinced of the need to study community-dwelling people over time, that is, "longitudinally." Thus, when Dr. Peter placed a phone call to Dr. Shock to find out how he could arrange to donate his cadaver for scientific study, Dr. Shock replied, "Let's have it when you are still alive!" The two scientists met and the BLSA came into existence. Over the subsequent near half-century, the scientific knowledge generated from the BLSA has become so vast that the study is universally considered the most comprehensive study on aging in human subjects ever attempted.

The BLSA study population consists of a series of healthy volunteers of different ages followed indefinitely with serial evaluations over time. A consortium of scientists collects and analyzes data from this study population with the aim of characterizing normal and pathological aging. Thus, the BLSA can be envisioned as a series of nested longitudinal and cross-sectional studies oriented toward (1) describing the anatomical, physiological, and functional changes that occur over the aging process, independent of diseases; (2) identifying the biological, behavioral, and environmental factors that account for these changes; (3) studying factors that predict healthy aging; and (4) developing hypotheses concerning possible targets for interventions that may positively affect several aspects of the aging process and prevent age-related pathology.

In just under 50 years of operation, and with approximately 3,000 participants enrolled and more than 800 manuscripts published in peer-reviewed journals, the BLSA has generated most of the current knowledge of the aging process in humans. Perhaps the BLSA's most important contribution involves disentangling the effect of disease and illness from the aging process and the development of the notion that aging is distinct from disease. Accordingly, most of the initial BLSA analyses were dedicated to describing changes in physiology and behaviors that are caused by aging per se, independent of disease. The BLSA portfolio includes original discoveries in the physiology and pathophysiology of the cardiovascular system, diabetes, diet and energy metabolism, age-associated modification of and risk factors for changes in cognition and personality, early predictors of prostate cancer, specific patterns of decline in sensory function, age-associated changes in body composition, decline in kidney function, secular trends in physical activity, and dietary intake. These domains represent a small sample of the wealth of information that the BLSA has provided.

In 2002, the BLSA underwent a major change in its design and objectives. Over the previous decade, the fields of genetics and molecular biology have made tremendous steps forward in the understanding of cell biology. Some of the traditional questions concerning the aging process had to be revisited and, to some extent, even reformulated. For example, the plausibility of a clear distinction between aging and disease had come under question. Thus, building on previous experience, the BLSA in 2002 entered into a new stage where its focus was on mechanisms that, over the aging process, lead to the condition of "frailty" conceptualized as increased susceptibility to disease and reduced ability to sustain stress. Additionally, frailty is believed to involve multiple physiological systems, including those important for mobility and cognitive function. It is hypothesized that over time, frail older persons show parallel, accelerated declines in anatomical integrity and function in multiple physiological systems, while individuals that develop specific diseases show, at least initially, clinical features that suggest selective and localized organ or physiological system damage. In accordance with this view, frailty is considered to contribute to fluctuation and instability of health status, high risk of multiple negative health-related outcomes and exhaustion of functional reserve. It is also hypothesized that (1) the destabilizing impact of acute medical events or traumas in older individuals is higher in frail than in non-frail individuals; (2) early stages of frailty may be detected only by tests that challenge functional reserve and compensatory ability; and (3) frailty

stems from dysfunction of some core mechanism that maintains integrity and function at a cellular level.

The paradigm used in the BLSA to study age-related frailty covers three basic levels of measurement: (1) mobility and physical function and cognitive capacity; (2) anatomical integrity and functionality of the physiological systems important for mobility, including the central nervous system, the peripheral nervous system, the muscular-skeletal system, the energy production and delivery system, and the sensory system; (3) physiological signaling systems important at the whole organism level for maintaining biological homeostasis, including energy production and delivery. These features include dietary intake, physical exercise, and immunology, with particular focus on inflammatory markers, autonomic nervous system, and oxidative stress/antioxidants. All of these measures are included in the BLSA core, in order to study their concurrent and longitudinal relationships and understand how changes in these parameters affect aging, age-related diseases and the development of frailty, loss of physiological reserve, and functional decline.

—Luigi Ferrucci

See also Longitudinal Research

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Baltimore Longitudinal Study of Aging, http://www.grc.nia.nih.gov/branches/blsa/blsa.htm

BANDURA, ALBERT (1925–)

Albert Bandura is a past president of the American Psychological Association (1973) and has been a professor at Stanford since 1953. Bandura was born in Alberta, Canada. He received his BA from the University of British Columbia in 1949 and his PhD in clinical psychology from the University of Iowa in 1952. Following his graduation, Bandura began teaching at Stanford and continues there as a faculty member to this day.

Bandura was trained as a psychologist in the behavioral tradition, believing that only the observable is worth studying. However, as his career developed, he became interested in cognitions, including mental images and language. Resulting from his interests in both behavioral and cognitive study, many of his theories contain concepts from both paradigms.

One of Bandura's most prominent theories, social learning, stems from his famous Bobo Doll Studies. In these studies, he showed children a video of a woman beating up an inflatable doll (a Bobo Doll). Following the video, they were allowed into a room that contained toys and a Bobo Doll. Bandura observed that the children would often model the woman's behavior in the video and abuse the doll instead of playing with the other toys. Many variations of this study were conducted, all resulting in the same conclusion—that children model violent behavior.

According to Bandura's social learning theory, there are four steps to modeling: (1) attention—the more attentive the observer, the greater the learning; (2) retention—being able to remember what is observed; (3) reproduction—recreating what has been observed; and (4) motivation—reason to model behavior. This notion of past reinforcement became important to Bandura; he believed that reasons for motivation include promised reinforcement, vicarious reinforcement, past punishment, promised punishment, and vicarious punishment. Bandura believed that punishment does not stimulate or negate behavior as well as reinforcement; therefore, reinforcement is more important in development.

From social learning came Bandura's belief that violence in children is not inherent, but learned. Children model behavior from others in their lives (most prominently family members) and from the media. Since he believed that aggression is learned, Bandura claimed that potentially criminal behavior can be avoided if aggression is diagnosed early and other learning behaviors are used to rectify the aggressive behaviors.

Another major contribution of Bandura's is the theory of self-efficacy. Self-efficacy is an individual's belief in their ability to accomplish certain goals. This belief stems from various sources and is domain specific, meaning that a person has efficacy beliefs regarding a specific task in a given situation and does not necessarily generalize those efficacy beliefs to other situations. Self-efficacy develops in people throughout their lives, and their past situations influence their current and future efficacy beliefs.

—Daniel W. Cox

See also Imitation, Observational Learning, Reciprocal Determinism, Self-Efficacy

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BAR/BAT MITZVAH

Bar Mitzvah means "son of commandment," a rather elliptical term connoting that a young Jewish male has reached the age of majority, and thus become obligated to perform ritual commandments. A child reaching Bar Mitzvah age may be counted toward the 10 adults required for a prayer quorum. A similar term—Bat Mitzvah—is used for Jewish females at the same juncture in life, even though they are not subject to the same ritual obligations as males. Many misunderstand the precise meaning of the term, taking it to connote, first and foremost, the ceremony that often celebrates a young person's coming of age. In essence, however, the terms apply to the *person* who becomes a Bar or Bat Mitzvah, a transition that takes place simply by virtue of turning 13; that the ceremony celebrating that juncture has come to be better known by the same term does not negate its true sense. It should be noted that, insofar as becoming Bar or Bat Mitzvah marks reaching puberty, many congregations have girls hold their ceremony at age 12, owing to the fact that girls usually reach puberty about a year earlier than boys. Also worth mentioning is the fact that, whereas the idea of holding a ceremony and celebration for boys is quite ancient, for girls it is under a century old, having originated in the United States. (The first female to hold a Bat Mitzvah ceremony, incidentally, was Judith Kaplan, daughter of Reconstructionist Movement founder Rabbi Mordecai Kaplan.)

Before turning to the ceremony and celebration, let us say a word about the religious significance of becoming majority age in Judaism. As explained in the entry under "Judaism," the Jewish religion, in practice, is a system of commandments that can be bifurcated between ethical and ritual. Whereas ethical commandments are always binding, ritual commandments are binding on different people at different times. The commandment of thrice-daily statutory prayer, for example, holds only for Jewish adult males; Jewish law exempts females, so as to prevent religious duty from conflicting with domestic duties, especially child rearing. Minors are also exempt from such commandments, owing to the fact that their minds and sensibilities are not yet able to grasp the significance of such religious activity. Puberty thus demarks the onset of attaining these assets. Once maturity is reached, the ritual commandments become binding for Jewish males. Traditional Jewish theology addresses failure to perform such commandments as sinful; thus, reaching Bar Mitzvah age elevates the spiritual onus, if you will, for neglecting ritual behavior.

Much more widely known are the trappings associated with reaching Bar and Bat Mitzvah age, especially as it is celebrated outside the deeply orthodox Jewish world. At their worst, some families have thrown lavish parties—renting yachts, spending thousands on famous entertainers, and the like—which have tainted the beauty and significance of the rite. For the most part, however, families have adhered to appropriate good taste and proportion, holding festive celebrations that aptly mark their child's coming of age.

In North America, most Bar and Bat Mitzvah ceremonies are held on Sabbath in the synagogue and call for the youngster to lead substantial portions of a worship service—much if not mostly in Hebrew—and usually speaking to the congregation about what the rite means to him or her. The Bar or Bat Mitzvah worship service usually is preceded by year-long preparation under the guidance of a special tutor, often the rabbi or cantor of the family congregation. The child usually learns to chant Hebrew parts of the Pentateuch designated for his or her Sabbath service, as well as a longer portion of Hebrew from Prophets called the "haftarah." Many young people also learn how to chant parts of the liturgy and lead the congregation in prayer.

It is, of course, customary for family and friends to give gifts to the Bar or Bat Mitzvah youth, especially in monetary form. Children often realize substantial sums that usually become savings toward college or car. In the best of outcomes, Bar and Bat Mitzvah training equips the youngster with prayer and speaking skills suitable for leading the congregation in prayer, scriptural cantillation, and study and instills in him or her the desire to regularly put his or her skills to use.

—Scott White

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BARKER, ROGER (1903–1990)

Roger G. Barker was a professor of psychology at the University of Kansas and a recipient of the Distinguished Scientific Contribution Award (1963) from the American Psychological Association (APA), the Kurt Lewin Award (1963) from the Society for the Psychological Study of Social Issues, and the G. Stanley Hall Award (1969), APA, Division 7 (1969). Barker was born in Macksburg, Iowa. After receiving a PhD from Stanford University, Barker spent 2 years as a postdoctoral fellow with Kurt Lewin at the University of Iowa and then devoted the initial decades of his career to studying child development and physical disability/rehabilitation. His career took a distinctive turn in the 1940s when he came to the disquieting realization that, after more than a half century of empirical research, psychologists knew little more than laypersons about the behavioral patterns of individuals as they go about their daily lives. In response to this shortcoming, Barker followed the path of naturalist researchers in the biological sciences by establishing a field research station that was intended to provide "easy access to phenomena of the science, unaltered by the selection and preparation that occur in laboratories." This groundbreaking effort was accompanied by the development of empirical methods for observing and recording the activities of individuals in everyday settings.

Through these methods, Barker learned that the order he observed in individuals' actions could not be adequately accounted for solely by considering the environment at the level of the individual. Instead, it was necessary to operate at the extraindividual (ecobehavioral) level of *behavior settings*, which are naturally occurring, dynamic, ecological structures generated from collective actions of individuals in a physical milieu. Behavior settings arise from such collective actions, while reciprocally constraining individuals' actions within their boundaries.

One property of behavior settings explored in detail by Barker and Gump in their landmark book *Big School, Small School* (1964) is level of staffing (or manning). Typically, behavior settings have an optimal number of individuals needed for adequate functioning; as a result, departures from that optimum have predictable effects. Individuals in an understaffed setting must be especially active, responsible, and flexible to maintain the functions of the setting, whereas individuals in an overstaffed setting tend to feel somewhat marginalized and less involved because their separate contributions may not be vital for its operation. Notably, these findings from studies of high schools were replicated in other kinds of settings.

A second program of research employed behavior setting surveys of a community to provide an account of the activity possibilities in that place, and in doing so, detail its ecological resources considered from a psychological viewpoint. Using this methodology, different communities can be compared, as Barker and Phil Schoggen did in *Qualities of Community Life* (1973), and the same community can be examined at different points in its history to assess qualities of stability and change.

The legacy of Barker's research program, overall, is the demonstration that psychology must maintain an *ecobehavioral focus* if it is to account for psychological phenomena in everyday settings.

—Harry Heft

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BATTERED CHILD SYNDROME

Battered child syndrome (BCS) has been defined as "the collection of injuries sustained by a child as a result of repeated mistreatment or beating." If the injuries sustained by the child suggest that physical trauma was inflicted intentionally or if the injuries appear on examination to be more severe than one might expect to have reasonably been produced by accident, BCS may be indicated. These injuries typically have been inflicted by an adult caregiver. BCS also has been referred to as shaken baby syndrome, child abuse, and nonaccidental trauma, but none of these terms accurately captures the *repeated* nature of the physical trauma to which BCS specifically refers.

Although the hallmark symptoms of BCS are physical trauma such as internal injuries, lacerations,

burns, bruises, and broken or fractured bones, emotional and psychological problems also tend to characterize children for whom BCS is an accurate clinical descriptor. Emotional and psychological problems, in turn, can manifest as serious behavioral problems and disorders later in the child's life, including alcohol abuse, narcotic abuse, and the physical and psychological abuse of others.

The incidence and prevalence of BCS are unclear but may characterize a majority of the nearly 14% of children in the United States who are physically abused each year. More specifically, in comparison to all other causes of child deaths, traumatic injury is the leading cause of child death. Nearly 2,000 of those children who are abused die as a result of this abuse, and for these children, BCS is particularly likely to be an accurate clinical label.

There are many theoretical frameworks that propose explanations for BCS. However, only one theoretical framework—evolutionary psychology—hypothesized and led to the knowledge that a particular parent-child relationship, namely, the stepparent-stepchild relationship, poses the greatest risk that a child will be abused and perhaps eventually display BCS. Research hypotheses derived from socioecological theoretical models purport that BCS can be explained in terms of the integration of individual factors and social contexts, referred to as sociosituational models. But residence with a stepparent was not identified among those individual factors or social contexts. Research hypotheses derived from family systems theory propose that family relationships function as a set of systems and subsystems. According to family systems theory, the formation of a stepfamily creates a disruption of the expected system and hence leads to negative outcomes, including child abuse and BCS. Because stepparental behavioral and legal responsibilities to stepchildren are fewer than the behavioral and legal responsibilities of genetic parents to their children, stepparents are at increased risk for abusing their stepchildren. This logic does not provide a complete explanation for why the risk of BCS is higher in stepfamilies, however.

Although previous research has found that stepparents report feeling unprepared for the new parental duties, stepchildren have been documented to feel adamant about a stepparent not "filling the shoes" of their genetic parent. Daly and Wilson argue that it is not that stepparents do not know what their role is as a stepparent, but instead that they do not want to do what is expected of them—invest in children unrelated to them, without receiving the benefits associated with investing in children of their own. Regardless of one's theoretical perspective, it is agreed that BCS is an important social problem that demands the attention of thoughtful scholars and the research efforts of behavioral and social scientists.

—Viviana A. Weekes-Shackelford and Todd K. Shackelford

See also Battered Woman Syndrome, Child Abuse

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BATTERED WOMAN SYNDROME

Battered woman syndrome (BWS) is a psychiatric and legal term that refers to the constellation of psychological effects experienced by abused women and is intended to explain, for example, why women stay with their abusive partners and why abused women sometimes kill their abusive partners. The term emerged in the late 1970s and has been a source of legal and academic controversy ever since. BWS is considered as a subcategory of posttraumatic stress disorder (PTSD) but is not listed by name in the *Diagnostic and Statistical Manual of Mental Disorders*. BWS is associated with the presentation of symptoms such as learned helplessness, reexperiencing

trauma, generalized anxiety, lowered self-esteem, social withdrawal, and intrusive recollections. Women in abusive relationships experience learned helplessness as a result of cycles of abuse and are thus repeatedly exposed to more violence. One feature of BWS holds that women stay with their abusers because of learned helplessness; this is one of the most controversial features of BWS, with many researchers arguing that the data are not supportive.

According to BWS, intimate partner violence proceeds through cycles composed of three phases: the tension-building phase, the active battering phase, and the loving, respite phase. During the tension phase, the victim is subjected to verbal abuse and minor physical abuse. The active battering phase results from the release of tension from the batterer and results in violence for a period of 2 to 24 hours. During this phase, the victim is unable to control the batterer with techniques that worked during the tension-building phase. This inability to control the batterer is theorized to result in learned helplessness. During the loving, respite phase, the abuse subsides and the batterer expresses remorse and promises that it will never happen again. The batterer exhibits loving and affectionate behavior shown earlier in their relationship. These affectionate behaviors result in falsely assuring the victim that the abuse was isolated and will not occur again.

There are several theories put forth to explain BWS. The three most common theories are Walker's battered women's syndrome theory, Gondolf and Fisher's survivor disorder theory, and PTSD theory. Survivor disorder theory differs from battered woman's syndrome theory in the emphasis of learned helplessness. Survivor disorder theory emphasizes a lack of support resources available to abused women as the primary reason they do not leave the abusive relationship. PTSD theory views BWS as a subcategory of PTSD and is currently a predominant theory of the development of BWS.

The validity of BWS as a psychiatric disorder has been debated intensely. Many have argued that the value of BWS lies primarily in its educational role in informing individuals about the impact of abuse on women through high-profile judicial proceedings. Others have argued that BWS is the product of legal defense teams negotiating a defense for the abused woman's actual or attempted murder of her abusive partner. The premises of BWS appear to have validity in the scientific community, but the rigorous standards for admitting the syndrome into DSM-IV-TR requires further empirical work.

Identifying the psychological and demographic characteristics of women in abusive relationships will be of substantial benefit to clinicians. By identifying such characteristics, clinicians will be in a better position to understand the abuse and, more importantly, understand women's reactions to the abuse and the effectiveness of various treatment programs. Recognition of BWS as a distinct disorder may result from an examination of these issues.

—Richard L. Michalski and Todd K. Shackelford

See also Battered Child Syndrome, Child Abuse

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BAUMRIND, DIANA (1927–)

Diana Blumberg Baumrind is considered to be among the foremost experts on parenting in the United States. She has also had a distinguished career as an academic researcher and commentator on the role of ethics and understanding of research findings. She has been awarded multiple national grants over a 40-year career devoted to family socialization and parenting research. Baumrind is the author of 58 articles in journals or as book chapters, as well as three books and monographs. She has also served as an editor and consultant to numerous professional journals and has been an esteemed member of multiple national psychology organizations.

Baumrind earned undergraduate degrees in both philosophy and psychology from Hunter College. She then completed graduate work at the University of California, Berkeley, earning her PhD in the specialty areas of clinical/social/developmental psychology. She served a postdoctoral clinical residency (1955–1958) at Cowell Hospital/Kaiser Permanente where she began to investigate families and socialization. In 1960, Baumrind began her association with the UC Berkeley Institute of Human Development, where she has remained her entire career.

Baumrind would come to develop a description and formulation of parenting styles and their impact on how children develop. As a single parent of three daughters, she chose research in part because the work hours allowed her more time with her family.

It was Baumrind who, in a series of reports, first identified styles of parenting she termed authoritative, authoritarian, and permissive. Observing children directly, as well as the parenting they received in their homes, she was then able to comprise a list of important parenting behaviors and compare those to how competently the children behaved.

Baumrind's model of parenting styles examined parenting behavior on two broad dimensions: accepting, nurturing, and responsive behavior; and parental expectations, controls, and demands. Parenting styles were a subset of whether behavior was high or low on the dimensions. Her work has served as a useful system for characterizing parenting behavior as it impacts child development outcomes.

Among Baumrind's contributions are critiques of research ethics in psychology and a defense of spanking as an appropriate discipline method within a parental repertoire of rewards and punishment strategies. Her honors include the G. Stanley Hall Award from the American Psychological Association (1988) and selection as an NIMH Research Scientist Award recipient (1984–1988).

—Joseph D. Sclafani

See also Parenting

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BAYLEY, NANCY (1899–1994)

Nancy Bayley was born and reared in The Dalles, Oregon, and died in Carmel, California. In the history of developmental psychology, few other individuals loom so large.

After grade school and high school in her home town, Bayley attended the University of Washington in Seattle. She planned to become an English teacher but changed to psychology after taking an introductory class taught by Edwin Guthrie, a leader in the psychology of learning. She earned her BS and MS degrees from the University of Washington in 1922 and 1924, respectively. Bayley studied the construction of performance tests for preschool children, a project prefiguring her later work on the development of intelligence. For her PhD, awarded in 1926 from the University of Iowa, she conducted one of the first studies of children's fears using the galvanic skin response.

From 1926 to 1928, Bayley taught at the University of Wyoming and then joined the Institute of Child Welfare (now Institute of Child Development) at the University of California at Berkeley as a research associate. There, she began what became known as the Berkeley Growth Study, a landmark longitudinal investigation on a large sample of healthy infants born in 1928 and 1929. Over the next half-century, Bayley and her colleagues followed these individuals as they grew from infancy to middle age. The work yielded important discoveries about physical, motor, and mental development; variability and individual differences; the relation of mental performance to environmental factors including socioeconomic factors such as parental education; and the predictability of later mental and physical status from child scores. It remains a treasure trove for scholars today. It also helped advance the study of adult development and the effects of historical forces on child development, including World War II and the Korean War. Over this period, Bayley also developed the Bayley Scales of Motor and Mental Development, still acknowledged as providing the best standardized measures of infant development and used throughout the world.

In 1954, Bayley moved to Bethesda, Maryland, to become chief of the section in child development at the National Institute of Mental Health. Her many accomplishments there included participation in the National Collaborative Perinatal Project for the study of cerebral palsy and other disorders. In 1964, she

returned to Berkeley, where she continued her studies of individuals from her growth study.

Bayley's many honors and awards include the G. Stanley Hall Award (1971) for outstanding contributions to developmental psychology, the Presidency of Division 7 (developmental psychology) of the American Psychological Association (1953–1954), and the Gold Medal from the American Psychological Foundation (1982). Throughout her long and distinguished career, Bayley sought to apply "scientific knowledge in the interests of human welfare and happiness" (1956, p. 121). She succeeded, and we are all the richer for it.

—Lauren Julius Harris

See also Bayley Scales of Infant Development

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BAYLEY SCALES OF INFANT DEVELOPMENT

The Bayley Scales of Infant Development (BSID-II), published by Psychological Corporation, are a set of scales that takes 45 minutes to administer and assess mental, physical, emotional, and social development. Because the scales provide an overall picture of the child's developmental status, they are often used to evaluate whether children are developing normally or may need further testing to determine if they need intervention or treatment of some kind.

The Mental Scale assesses sensory and perceptual ability, memory, problem solving, learning, and early verbal skills. Sample items include measuring infants' responses to a bell or to tracking a toy with their eyes. The Motor Scale evaluates physical activities that require the use and of both gross and fine motor skills, including large muscle activities (e.g., sitting and walking) and small muscle activities (e.g., picking up small objects). The developmental level for the status of emotional and social development is assessed through the use of a Behavior Rating Scale (formerly called The Infant Behavior Record or IBR) using a five-point scale. The Behavior Rating Scale assesses variables such as attention and arousal, orientation and engagement, and emotional regulation. The Behavior Rating Scale scores are based on the caregiver's input as well as the examiner's judgments. The test is completed by the examiner after the administration of the Mental and Motor Scales and produces a percentile score for comparison to a nonclinical population. Both the Mental and Motor Scales produce a standardized score.

The test was updated in 1993. Some of the changes include an increase in the age range from 1 month to 42 months, the revision of stimuli, and the addition of almost 50% in new items to reduce racial and gender bias and make the stimuli more attractive to children. New normative data are now available for children with various clinical diagnoses such as Down syndrome and prematurity. The BSID is widely used in research settings, has excellent psychometric characteristics, and has the largest standardization sample of any test.

—Neil J. Salkind

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BEREAVEMENT

The process of human development inevitably ends in death. Bereavement, grief, and mourning are terms used to describe distinct aspects of people's reactions following the death of a loved one or other significant loss. *Bereavement* is the state that results from having experienced the death of a loved one; so to be bereaved is to have suffered a loss. And when someone is bereaved, they grieve. *Grief* is the personal

reaction to both death- and nondeath-related losses, which includes feelings, physical sensations, and thoughts. *Mourning* is the internal struggle to reorient to life and the outward behavioral expression of grief that is shaped, in large part, by social and cultural norms, rituals, traditions, and practices.

The terms bereavement, grief, and mourning are distinct concepts, but both the general public and professionals frequently use the terms interchangeably, although often with different intentions and different definitions. To maintain consistency with general and professional use, in this entry the terms grief and mourning will be used interchangeably to describe how people respond to and cope with the state of bereavement.

GENERAL CHARACTERISTICS OF GRIEF AND MOURNING

It is important to understand some basic characteristics of grief and mourning. First, they are natural processes that facilitate healing; in that respect, they are helpful, albeit painful, experiences. Second, they are not linear, orderly, predictable, or generalizable processes. Third, although there are some similarities across people, each individual experiences grief and bereavement differently. Additionally, each person mourns all deaths differently since each death and relationship is unique. Accordingly, the phrase so commonly uttered to the bereaved, "I know just how you feel," can never be true. Additionally, the processes of grief and mourning do not result in the bereaved person "getting over" the loved one who has died. Rather, grief and mourning are more likely to result in a gradual adjustment to the loss that is often never fully resolved or "gotten over." Finally, grief is pervasive, affecting potentially every aspect of the bereaved person's life.

ELEMENTS OF GRIEF AND MOURNING

The bereaved experience grief in all areas of life: physical, psychological, social, and spiritual. Common *physical/somatic* grief-related reactions include sleep difficulties, appetite changes, nervousness, restlessness, heart palpitations, chest or throat tightness, shortness of breath, nausea, muscle weakness, exhaustion, trembling, dry mouth, sighing/yawning, and crying.

Psychological reactions to grief include emotional, cognitive/intellectual, and sensory components. Common emotional reactions include sadness, fear, anxiety, anger, guilt, depression, hopelessness, helplessness, frustration, shame, irritability, tension, and a sense of being overwhelmed. Common cognitive responses include yearning (longing for the deceased), disbelief, preoccupation with thoughts of the deceased, lack of concentration, and impaired memory. Altered or heightened sensory responses are also reported by the bereaved. For example, some may experience dreams, apparitions, or hallucinations related to the deceased.

Social grief-related reactions may include isolation, alienation, or withdrawal. Conversely, some bereaved people cannot tolerate being alone and experience anxiety or even panic when not in the presence of others.

Spiritual grief-related reactions may include spiritual emptiness, loss of meaning in life, or disillusionment or anger with God or a higher power. However, bereaved individuals may also find more spiritual comfort than at any other time in their lives and seek to nurture an initial or stronger relationship with God in an effort to find meaning and comfort.

THEORIES/MODELS OF GRIEF AND MOURNING

In order to better understand how bereaved people grieve and mourn and how others might best support them, researchers and clinicians have developed different models or theories that attempt to account for how people react to and recover from the death of a loved one. Early conceptualizations of grief and mourning presented by researchers such as Elizabeth Kübler-Ross and Collin Murray Parkes focused on predictable stages or phases of reactions that bereaved individuals went through. These approaches have been criticized for assuming that all bereaved persons grieve in similar, prescribed ways. Most current conceptualizations of grief and mourning incorporate individual differences into the models and are task- rather than stage-oriented.

William Worden's Task-Based Model of Mourning

William Worden has proposed one popular model of mourning that includes four tasks that the bereaved undertake following a loss. *Task 1: Accepting the reality of the loss* means accepting the reality of the death

intellectually as well as emotionally. *Task 2: Working through to the pain of grief* is surrendering to and experiencing the physical, emotional, social, and spiritual pain that results from the death of a loved one. This task can be complicated by societal expectations to quickly "get over it" and "move on." *Task 3: Adjusting to an environment in which the deceased is missing* means adjusting to the end of one's physical, emotional, spiritual, and social life that existed in relationship with the deceased. *Task 4: Emotionally relocating the deceased and moving on with life* involves realizing that although the deceased will always be in one's thoughts and memories, life continues and it is important to go on to live and love fully.

Therese Rando's Task-Based Model of Mourning

Therese Rando offers an alternate task-based model of mourning, which includes the six R's (Rando, 1991). To *recognize* the loss is to acknowledge and understand the implications of the death. To *react* to the separation of the loss involves experiencing the pain by feeling, identifying, accepting, and expressing one's reactions. To *recollect* means to realistically remember and reexperience feelings associated with the deceased. To *relinquish* attachments to the deceased and to one's assumptive world involves the process of letting go. To *readjust* is to move adaptively into the new world by developing a new relationship with the deceased and forming a new identity. Finally, the bereaved must *reinvest* in their new world.

Both Rando and Worden present task-based models of mourning that support the long-standing conceptualization of grief as "work." However, researchers Margaret and Wolfgang Stroebe and Henk Schut have highlighted shortcomings with the traditional "grief work" conceptualization including lack of definitional clarity and operationalization, absence of strong empirical evidence to support the model, and lack of generalization across cultures. Accordingly, Stroebe, Stroebe and Schut have argued that grief "work" is not always essential or necessary for adjustment during bereavement. Regardless of which model of grief and mourning one considers, all share the challenge of adequately capturing the complete essence of the experience across all bereaved persons because there are so many factors that combine to individualize bereavement.

FACTORS THAT INFLUENCE GRIEF, MOURNING, AND BEREAVEMENT

Bereavement is shaped by numerous factors, such as the *bereaved*'s *psychological stability, intellectual level, maturity, and loss history*. The *deceased person's role in the family* also influences one's experience of bereavement. For example, if the deceased person was the center of the family or had daily, close contact with the bereaved, the impact of the death will often be greater than that of a more distant, less central loved one. The *nature of the relationship with the deceased* also influences bereavement. For example, ambivalent relationships characterized by both love and pain are generally difficult to mourn. The *circumstances of the death* also influence grief and mourning. Sudden and unexpected deaths are often difficult to adjust to because of the lack of preparation for the death and because they often result from traumatic circumstances (e.g., accident, homicide, and suicide). Additionally, the *perceived timeliness of the death* influences grief and mourning. Generally, the death of a child is considered to be untimely, whereas the death of someone who has lived a longer life is viewed as more timely. Finally, one's *ethnic, cultural, and religious background* also shapes the bereavement experience.

CULTURE AND BEREAVEMENT

The specific role that culture, religion, and ethnic background play in bereavement varies. Additionally, most researchers have focused on cross-cultural mourning practices rather than on intrapersonal, emotional experiences of grief. In general, those researchers who have studied grief across cultures (e.g., Chinese, Taiwanese, British, African, Mexican, Puerto Rican, Anglo-American, Native American, and African American) have not found significant differences in the grief experience.

Conversely, mourning rituals and practices have been found to vary widely across cultures. For example, funeral rituals, the length of the period of mourning, and other acceptable and expected customs and practices (e.g., what color clothes to wear and for how long, what social events are permissible to attend, how publicly or privately one mourns, whether to speak the name of the deceased during the mourning period) reflect unique and distinct cultural and ethnic values.

Often the mourning rituals and practices of a cultural or ethnic group are intimately connected to its religious

beliefs. For example, among African Americans, funeral rituals are tied to one's religion. Traditional or more conservative Catholic and Episcopalian services involve formal rituals performed by priests in robes. Conversely, less formal Baptist services often include singing of hymns, readings by family and friends, and a eulogy delivered by the family pastor.

SUMMARY

Experiencing loss and death is a normal part of life, and all people grieve and mourn during the period of bereavement that follows the death of a loved one. Exactly how a bereaved person mourns and experiences grief, however, is shaped by many unique biopsychosocial and cultural factors.

—Brenda Moretta Guerrero

See also Death

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BEREAVEMENT OVERLOAD

The term "bereavement overload" was coined by psychologist and gerontologist Robert Kastenbaum over 30 years ago to refer to circumstances in which a grieving individual confronts multiple losses simultaneously or in rapid succession, such that one loss cannot be accommodated before another occurs. Although bereavement overload can be triggered by a great range of circumstances (e.g., deaths of multiple friends or family members in a vehicular accident, war, fire, natural disaster, or even from unrelated causes over a short span of time), much of what is known about its impact has resulted from the study of the AIDS pandemic and the mounting losses of later life. Viewed in a developmental frame, however, overwhelming grief can arise at any point in the life cycle, posing challenges that are distinctive to each phase of life and type of loss.

Much of the focus on bereavement overload in the lives of children has been stimulated by a concern for the plight of AIDS orphans, particularly in developing countries, where entire communities can be decimated by mounting losses in the context of inadequate or nonexistent healthcare. In such cases, complications in grief *per se* (e.g., chronic depression, trauma, and separation distress resulting from ruptured attachments to parents and other caregivers) can be compounded by pervasive insecurity about one's very survival in a social system that is overwhelmed by the pandemic and related stresses engendered by poverty and unemployment. Even in developed countries, AIDS orphans confront unique problems of stigmatization and secrecy regarding the nature of their loss and do so without the benefit of the more developed psychological and social resources on which most adults can draw.

In the working years of adulthood, members of the gay community and healthcare workers are particularly likely to experience bereavement overload, which may be exacerbated by the inherent stress associated with these roles. Gay men grieving multiple losses to AIDS must also contend with stigmatization, societal invalidation, and the absence of traditionally available support systems. Men contending with a high number of such losses—averaging dozens of friends and partners over the 20 years of the pandemic—often report death anxiety, defensive avoidance, and intrusive experiences, which can be managed through seeking social support or counseling and reconstructing a meaningful self-identity in the wake of loss.

Healthcare workers experiencing multiple losses are put in the position of balancing their own grief for dying patients with their desire and need to be competent care providers. Striking this balance can be a tremendous strain, whose traumatic impact grows with accumulating experience in "high death" specializations. In general, it appears that processing emotion, seeking the support of peers, and active confrontation rather than avoidance of loss are therapeutic for this population.

Finally, later life can usher in a predictable sequence of losses, as one's parents, older relatives, and eventually siblings, spouse, and peers age and die in increasingly quick succession. Feelings of helplessness, guilt about outliving other family members, and diminished self-esteem are common responses to this seemingly relentless progression, especially for older adults who are themselves in failing health or who suffer from social isolation. Suicide can be a particular risk at this stage of life and requires close

monitoring by health care professionals who might mistakenly interpret the silent depression of stoic elders as a normal response to changing life circumstances. Although antidepressant medication can make a useful contribution to treating mood disorders associated with bereavement overload in the final decades of life, mobilization of social, familial, and spiritual supports are especially important at this time.

In summary, the germinal literature on bereavement overload highlights a cluster of responses—depression, helplessness, death anxiety, isolation, survivor guilt, and traumatic stress—that are common to circumstances of multiple loss, as well as distinctive issues that arise in connection with different stages of the life cycle. Conversely, coping strategies that concentrate on helping others, joining groups, strengthening ties to family and community, grieving shared losses, and seeking to make meaning of catastrophic bereavement can help promote its integration into a changed life, but one that nonetheless is characterized by newfound purpose and reconnection.

—Robert A. Neimeyer and Jason Holland

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BERKELEY/OAKLAND LONGITUDINAL STUDIES

The three longitudinal studies that constitute the Intergenerational Studies (IGS) of the Institute of Human Development (IHD) were initiated in the late 1920s, and the study members represent two birth cohorts: people born in Berkeley in 1928–1929 and people entering an Oakland middle school in 1932 (born in 1920–1921). Data were collected from and about them and their families through adolescence and, subsequently, from them and their spouses, parents, and children.

GUIDANCE STUDY

The 248 original subjects in the Guidance Study (GS) were drawn from a socioeconomic survey of every third birth in Berkeley, California, during the 18 months between January 1, 1928, and June 30, 1929. The focus of the study was behavior problems of preschool children.

BERKELEY GROWTH STUDY

The Berkeley Growth Study (BGS) was initiated with a sample of 61 healthy, full-term infants born in one of two Berkeley hospitals between September 15, 1928, and May 15, 1929, to white, English-speaking parents. The study was designed to trace normal intellectual, motor, and physical development in the first year of life.

OAKLAND GROWTH STUDY

Recruited for the Oakland Growth Study (OGS) (initially called the Adolescent Growth Study) were 212 youngsters from five elementary schools in Oakland, California, who intended to attend the junior high school selected as the center of observation for the research. The subjects ranged in age from 10 to 12 at the time of initial data collection in 1932. The focus of the OGS was normal adolescent development, especially physical, physiological, and social.

DATA COLLECTION—PRE-ADULT

Guidance Study

During the first 18 months of the subjects' lives, data were collected by staff of the Berkeley survey. Pre- and perinatal data were obtained from physicians, hospitals, and mothers. From the infant's 3rd through 18th month, a public health nurse visited the home every 3 months to collect data on height, weight, health, diet, and behavior. Parents provided information about their health histories and the health histories of their parents as well as detailed demographic and socioeconomic data on the family at the time of the child's birth.

Data collection by GS staff and the institute began when the study members were 21 months old. The subjects were assessed regularly for physical and

intellectual development, and their mothers provided information about the subjects' habits, interpersonal behaviors, interests, and personality. Interviews with the children on the same topics began when they were 6 years old. In addition, school performance and other behavioral data were collected from teachers, and social and personality data were collected with sociometric measures, projective tests, and interest and vocational inventories.

Berkeley Growth Study

During the subjects' first 4 days of life, physical, physiological, and neurological assessments were done. The subjects were assessed frequently through age 3 and less frequently in later childhood and adolescence. At all visits, subjects were rated on personality traits and behaviors, and narrative notes were made about their behaviors, attitudes, and reports of events in their lives. In addition, projective tests and leisure-time, interest, personality, and vocational inventories were included on an irregular schedule.

Oakland Growth Study

The data primarily are (a) responses to self-report questionnaires devoted to personality, attitudes, interests, and activities; and (b) ratings of subjects' characteristics by study staff based on observation of the subjects in various situations.

In the early 1960s, the first steps were taken toward collaborative planning for the three studies. Despite considerable differences in stated objectives and data collection, the staff of each of the studies had secured rich data on adolescent development and reasonably comparable data on early adulthood, including data on occupational involvement, marriage and children, relations with parents, social attitudes, and intellectual and emotional status.

DATA COLLECTION—ADULT

Subjects in the three longitudinal studies participated in data collection as adults prior to the first of the integrated data-collection efforts. In the most comprehensive of these recalls, the GS subjects were 30 years old, the BGS subjects were 36–37, and the OGS subjects were 37–38. Between 1969 and 1972, GS and OGS subjects were seen in the first consolidated data collection. The second consolidated data collection took place between 1981 and 1983 and consisted of interviews, cognitive assessment sessions, collection of physical information, and self-administered questionnaires.

The three longitudinal studies that constitute the Intergenerational Studies of the IHD at the University of California at Berkeley provide a wealth of demographic data, personality data, data about parents and families of origin, data concerning attitudes and behavior, physical and medical data, and cognitive assessment data about participants. For more information, contact the longitudinal studies' archivist at IHD or the director of the institute. The address is 1203 Toldman Hall-1690, University of California, Berkeley, CA 94720-1690.

—Carol Huffine

See also Longitudinal Research

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Institute of Human Development at University of California, Berkeley, http://ihd.berkeley.edu/hm2.htm

BILINGUALISM

Bilingualism refers to the regular use of two languages by speakers who have a high level of proficiency in each language. In contrast, multilingualism refers to the regular use of three or more languages on a regular basis. Between one third and one half of the world's population is bilingual or multilingual. In the United States, bilingualism and multilingualism are much less common than in other countries. According to the 2000 United States census, one in five respondents indicated that they spoke a language other than English at home. Public schools report that approximately one child in eight speaks a language other than English at home. In the coming decades, the number of bilingual speakers in the United States is expected to rise due to continued immigration.

CHILDHOOD BILINGUALISM

Children who are raised in an environment where more than one language is used on a regular basis can

easily acquire two or more languages concurrently. This type of bilingualism is referred to as *simultaneous bilingualism* and contrasts with *sequential bilingualism*, which occurs when a second language is learned after a first language has already been acquired. Circumstances giving rise to simultaneous bilingualism include when each parent is a native speaker of a different language or when the infant is raised in a home where a single language is used, but there is regular contact with a speaker of another language, such as a relative or household worker. There is no evidence that learning more than one language during childhood places an unmanageable burden on the child or results in long-term delays in the use of either language.

Becoming bilingual is much more easily accomplished during early childhood than later in life. Eric Lenneberg argued that the ideal time for learning any language was from birth to puberty. His view was called the *critical period hypothesis* and is described in his 1967 book *Biological Foundations of Language*. Following this view, learning a second language after puberty may require more effort and be less successful than learning a second language during early childhood. In the United States, most students receive second language instruction after puberty in high school or college. In general, this type of second language instruction rarely results in native-like proficiency in a second language. In countries where the rates of bilingualism are higher than in the United States, school children routinely receive second language instruction in elementary school. This comparison suggests that one factor in producing large numbers of highly skilled bilinguals may be providing second language instruction to children before the critical period has ended. However, it must be noted that the motivation to learn a second language is also an important factor in determining whether one who receives second language instruction will become bilingual. It may be the case that high school and college students in the United States are generally less motivated to the learn second languages than students in other countries.

There is compelling evidence that learning more than one language during childhood produces benefits in general cognitive development. Having experience with more than one language may enable the child to achieve a mental flexibility at an earlier age than monolingual children. This mental flexibility may enable the bilingual children to develop an early awareness of how language works. Research reported by Sandra Ben-Zeev in 1977 showed that bilingual children outperformed monolingual children on verbal as well as nonverbal tasks. Ben-Zeev suggested that the bilingual children were more skilled than monolingual children at discovering and applying the rules required in each type of task. Research reported by Ellen Bialystok in 1991 showed that bilingual children outperformed monolingual children on verbal and nonverbal tasks requiring children to direct attention to a task in the presence of distracting information. However, it must be noted that children who succeed at becoming bilingual at an early age may differ in a variety of ways from same-age children who are not bilingual. It may be the case that the actual cause of bilingual children's superior performance on cognitive tasks also accounts for their ability to become bilingual at an early age. It is not known how many young children receive exposure to more than one language, yet fail to become bilingual.

BILINGUAL EDUCATION

In the United States, there has been resistance to bilingual education since the end of World War I, when the use of languages other than English was viewed as un-American. In 1968, the Bilingual Education Act was established to provide federal money to local programs addressing the needs of children for whom English was a second language. In 1974, state and local governments were required to meet the needs of school children with limited proficiency in English. The United States Supreme Court ruled in the case of *Lau v. Nichol* that when schools fail to provide bilingual instruction to school children who have limited proficiency in English, they are violating the children's civil rights. The ruling was a landmark for advocates of bilingual education; however, the ruling did not mandate how bilingual education should be delivered to students. Consequently, local communities implemented a variety of strategies to avoid violating the law.

One of the most commonly used bilingual education programs is Transitional Bilingual Education (TBE). In TBE, school children study English but receive instruction in all other academic subjects in their native language. In such programs, children eventually transition into classrooms in which English is the only language of instruction. The length of time children are allowed to transition to English may vary

across school districts. Many school systems use transition periods of only 3 years. A second type of program is called two-way or dual programs. In these programs, children receive instruction from bilingual teachers who encourage students to improve their skills in their native language as well as English. These programs may use the students' native languages not only to teach them the standard curriculum but also to teach them about their ethnic heritage, culture, and history. In 1992, the National Academy of Sciences published a report reviewing studies that evaluated bilingual education strategies. The results suggested that students who receive bilingual education scholastically outperformed students who did not receive bilingual education.

SOCIAL IMPLICATIONS

In the 1970s, immigration to the United States reached record levels. Four million legal immigrants and approximately 8 million undocumented or illegal immigrants came to reside in the United States. Since then, many federal, state, and local agencies have addressed the need for multilingual services, for education as well as voting, tax collection, delivery of social services, disaster assistance, and information about consumer rights. Many states now offer driver's license tests in languages other than English. For example, Massachusetts offers driver's license tests in 24 languages. In Miami, Florida, there are areas of the city where street signs are printed in both English and Spanish. In New York City, classroom instruction is provided in 115 different languages. Projections of future immigration suggest that the numbers of immigrants in the United States will continue to rise in the coming decades. It is reasonable to assume that there will be increased burdens placed on schools and government agencies to provide services in languages other than English.

Data from the 2000 United States Census confirm that English remains the most widely spoken language in the United States with 215.4 million speakers. The second most widely spoken language in the United States was Spanish with 28.1 million, followed by Chinese with 2 million speakers. The language with the largest proportional increase in the number of speakers was Russian. The number of Russian speakers nearly tripled in the 1990s, from 242,000 to 706,000. The second largest proportional increase was among speakers of French Creole whose number of speakers more than doubled, from 188,000 to 453,000. Despite the growing linguistic diversity of the United States, the vast majority of U.S. residents use English on a regular basis. Overall, 92% of respondents in the 2000 U.S. Census reported having no difficulty speaking English.

There has been opposition to bilingual education in public schools by the English-only movement. The movement is composed of a number of political groups who have supported making English the official language of the United States. There are 28 states in which English has been distinguished as an official language. In Hawaii, English and Hawaiian are recognized as official languages. In New Mexico, English and Spanish are recognized as official languages. However, the United States government has not yet identified any language as the official national language.

SUMMARY

While current rates of bilingualism in the United States are well below of those in other parts of the world, the number of speakers for whom English is a second language is expected to rise in the United States. The increase in bilingualism will continue to create challenges for local schools and government agencies and fuel the political debate regarding the extent to which education and government services should be provided in languages other than English.

—Shelia M. Kennison

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BINET, ALFRED (1857–1911)

Alfred Binet was a French pioneer of modern psychological testing who developed the prototype of many intelligence tests in use today, including the Stanford-Binet Intelligence Scale. Binet was born in 1857, the only child of a physician father and artist mother. His independent wealth allowed him to pursue his interests and work without remuneration throughout his life. Binet earned a law degree and attended medical school, but he abandoned both fields and turned his attention to experimental psychology. This led him to volunteer to work for Charcot, the famous neurologist who directed the Salpêtrière Hospital in Paris. Through his study of hypnosis during this period, Binet came to appreciate the value of the case study method and the role of suggestibility. In 1891, he went to work with Beaunis at the Sorbonne's Physiological Psychology Laboratory; in 1894, Binet became director of that lab, where he remained for the rest of his life. Binet's interest in psychology caused him to start the first French journal in the field, *L'Année Psychologique,* in 1895.

As an experimental child psychologist, Binet led a research program he called "individual psychology." Binet believed that intelligence could never be isolated from the actual experiences of individuals or their environments. His use of case studies helped him to appreciate the fact that intelligence is complex and needs to be measured with multidimensional scales. He doubted the value of the sensorimotor tests for assessing mental abilities that predominated at the time. Binet believed testing should tap higher order mental abilities instead of elementary processes. His 1903 book, *L'Étude expérimentale de l'intelligence*, is a notable work that recounts Binet's observations of many mental tests he tried on his two daughters.

In 1904, following the enactment of universal education laws in France, Binet was appointed to a commission formed by the government to investigate mental subnormality—as mental retardation was then known—in children. Realizing the need for a reliable diagnostic system to identify this condition, Binet and his collaborator Theodore Simon set out to develop a series of test tasks that would differentiate levels of retardation. Binet quickly came to see that the age at which children were able to accomplish certain tasks was a crucial factor in discriminating levels of mental acuity, with normal children able to pass the same tests at younger ages than those who were deficient. The Binet-Simon Intelligence Scales, published in 1905, used items of increasing difficulty that assessed a wide variety of mental functions and were tied together by the use of practical judgment. Revised scales incorporating standardization and a formula for calculating "intellectual level" were issued in 1908 and 1911. Nevertheless, Binet was hesitant to quantify intelligence because he believed that one could improve the intelligence levels of retarded children and that intelligence is a not fixed quantity. At the time of his death in 1911, Binet was working on a further revision of his scale.

—Susana Urbina and Laura Henderson

See also Intelligence

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BINGE DRINKING

The term "binge drinking" has traditionally been used in reference to extreme levels of alcohol consumption over a prolonged period of time, a drinking pattern common among alcohol-dependent individuals. More recently, the term has been used to denote a pattern of "heavy episodic drinking" common in adolescents and young adults. Although this type of drinking behavior is likely to result in intoxication, it represents a level of consumption considerably lower than the original definition and generally over a limited time interval. Most commonly, binge drinking is defined as five or more drinks on a single drinking occasion for men and four or more for women. Binge drinking in its current definition has become a major public health issue over the past two decades due to the established relation between this type of drinking and the experience of significant consequences to the individual and society.

Attention to the topic was heightened with the initial publication of binge drinking rates from a national sample of college students in 1994. This study indicated that more than 40% of college students were binge drinkers and nearly 20% were frequent binge drinkers (at least three times in the past month). Despite increased prevention efforts on college campuses, rates of binge drinking have remained relatively stable over the past decade. In 1996, results of the "Monitoring the Future" surveys conducted by the National Institute on Drug Abuse reported binge drinking rates in secondary school students, finding a disturbingly high rate among high school seniors (30%) that has not changed appreciably in the past 8 years. Although rates significantly decrease after college, approximately 25% of individuals in their 30s engage in binge drinking and 14% of the U.S. adult population met this standard in a recent nationally representative sample.

The current definition of binge drinking has been criticized on several grounds. First, the 5/4 criterion does not account for a number of important variables including time over which drinking occurs, body weight, and stomach contents. The result is that nearly half of the individuals who met the binge drinking criterion in one study were not drinking to intoxication as defined by a .08 blood alcohol concentration (the legal limit in most states). Another concern is that this definition leads the public to believe that dangerous drinking is normative based on the high percentage of young people meeting this criterion. The concern is that individuals who might not otherwise drink at this level will do so in order to meet societal norms. Despite the limitations of the 5/4 standard, it has demonstrated utility from a public health perspective.

Binge drinking is associated with an increased likelihood of other behavioral risks including driving after drinking, unprotected sexual behavior, and physical and sexual aggression. For example, binge drinkers in the general population are 14 times more likely to drive while impaired by alcohol than nonbinge drinkers. As a result of increased risk behavior, binge drinkers also report an increased incidence of a variety of negative consequences including alcohol-related motor vehicle accidents, HIV and other sexually transmitted diseases, alcohol-related injuries, and legal difficulties. Wechsler and colleagues (2002) found that infrequent binge drinkers were 3 to 4 times more likely to experience a range of negative consequences relative to nonbinge drinkers and frequent binge drinkers were roughly 10 times more likely to experience these same consequences.

SUMMARY

The term "binge drinking" has come to refer to a pattern of heavy episodic drinking common among adolescents and young adults. Although this standard may have limited clinical utility in terms of identifying individuals with alcohol use disorders, it has considerable relevance from a public health perspective. Individuals who meet or exceed this level of consumption are at increased risk for a variety of negative consequences, with frequent binge drinkers at particularly high risk.

—William R. Corbin

See also Alcoholism

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BINGE EATING

Binge eating is defined as the uncontrolled eating of a large amount of food within a discrete period of time (e.g., within any 2-hour time period). Within the current *Diagnostic and Statistical Manual of Mental Disorders*, binge eating has two distinguishing characteristics: (1) the consumption of an amount of food that clearly is larger than most people would eat in a

similar period of time and under similar circumstances and (2) a lack of control over what or how much is consumed or how long the eating episode lasts. In 1959, Albert Stunkard originally described binge eating as a pattern of eating seen among a subset of obese patients. Currently, binge eating is a cardinal symptom of two eating disorders, bulimia nervosa and binge eating disorder, and it also may be present in a third eating disorder, anorexia nervosa.

Historically, there has been some controversy regarding the definition of a binge episode, particularly with respect to the amount of food and, correspondingly, the number of calories consumed during a binge. This controversy emerged from a literature indicating that individuals who binge often consume an extremely large number of calories during a binge. However, there also was evidence that there was a large range in the caloric content of the food consumed during a binge, with the caloric content of a binge episode comparable to that consumed during a large meal or snack. Findings such as these suggest subjectivity in individuals' views of what constitutes a binge episode. Consequently, Fairburn (1995) and Fairburn and Wilson (1998) introduced the distinction between objective binges and subjective binges. During an objective binge, the individual engages in the uncontrolled eating of an excessively large amount of food. In contrast, during a subjective binge episode, the individual consumes a relatively normal or even small amount of food, but he/she views the amount of food as excessive and experiences a sense of loss of control.

Binge eating is associated with a variety of emotional consequences. Binge episodes frequently are triggered by negative affect, suggesting that bingeing may serve as a way to manage or avoid negative affect, to self-soothe, to distract oneself from a stressful situation, or to numb or escape painful or distressing emotions, if only temporarily. Binge episodes typically are followed by negative emotions, including guilt and shame. In addition, binge episodes frequently are followed by a fear of weight gain. This fear may lead to purging via self-induced vomiting or the use of laxatives or diuretics and/or severe restriction as a means to counteract the binge and prevent weight gain. When this occurs, binge eating, purging, and restriction may become part of a self-perpetuating cycle.

Binge eating also is associated with impaired interoceptive awareness, a difficulty recognizing and accurately responding to internal states, including sensations of hunger and fullness. Individuals who binge may have difficulty discerning sensations of hunger and fullness. Impaired interoceptive awareness is more likely to emerge if the individual vacillates between periods of strict dietary restraint (during which hunger cues may be ignored) and periods of binge eating (during which satiety signals may be overridden or ignored).

Binge eating is associated with short-term and long-term physical consequences. The short-term physical consequences of binge eating primarily consist of feeling uncomfortably full, which may be associated with abdominal pain or discomfort, stomach distension, and bloating. Less common but more severe long-term consequences of binge eating include gastric dilation or gastric rupture. Binge eating in conjunction with other eating disorder symptomatology, including restriction and/or purging, is associated with health risks such as electrolyte disturbances, cardiovascular abnormalities, decreased bone density, and erosion of dental enamel.

—Janis H. Crowther and Ellen F. Harrington

See also Eating Disorders

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BIOLOGICAL CLOCK

Life on earth has evolved with the ability to cope with cyclical changes in the environment. The length of these environmental cycles is determined by our planet's rotational period (day-night cycle) as well as the period of its revolution around the sun (e.g., seasonal cycles). The survival of an organism depends on its ability to initiate physiological (e.g., body temperature, hormonal secretions) and behavioral events (e.g., activity, migration, hibernation) at the appropriate point in the environmental temporal cycle. In order to do so, an organism needs an effective internal timekeeping mechanism. Biological timekeeping ensures

that this occurs by anticipating important events in the environment and keeping track of the passage of time. The biological clock, the body's internal chronometer, is responsible for regulating and maintaining an internal temporal structure that is stable and synchronized with the appropriate environmental time cycle. Biological rhythms are the output of the biological clock, and their cycle can range from a few milliseconds to days or even months.

The most commonly observed biological rhythms are circadian rhythms. The word circadian comes from two Latin words, "circa," which means "about," and "dies," which means "a day." Circadian rhythms are the output of the circadian oscillator or clock. We can measure the endogenous period of the circadian oscillator by observing its output rhythms under constant environmental conditions. The period of the circadian oscillator when measured under these conditions is called the free running period (FRP). It is generally a little longer or a little shorter than 24 hours and will remain the same under constant conditions. The free running period will also remain unchanged when measured at different ambient temperatures.

One of the functions of the circadian oscillator is to anticipate events in the environment and estimate the passage of time so that key physiological and behavioral events occur at the appropriate point in the environmental time cycle. To achieve this, the circadian oscillator needs to be synchronized with the environmental time cycle. Since the endogenous period of the circadian oscillator is a little shorter or a little longer than 24 hours, it has to be either delayed or advanced to match the 24-hour period of a natural environmental cycle. There are many different environmental factors such as temperature, humidity, light, social variables, and food availability that oscillate with a period of 24 hours and serve as effective synchronizers. The environmental stimulus that synchronizes the circadian oscillator is called the *entraining agent* or *zeitgeber*. Research has demonstrated that the 24-hour light-dark cycle is the most powerful entraining stimulus. Exposure to light can cause the circadian rhythm to shift appropriately (i.e., advance or delay) to match the period of the entraining environmental stimulus.

In the 21st century it has become very important for us to develop an understanding of the circadian system and its functions. The need for constant availability of essential services in modern society requires many in the workforce to reverse their normal diurnal sleep/wake schedule as in the case of rotating- or night-shift work. Such schedules result in an individual's physiological and behavioral rhythms being initiated at inappropriate points in the environmental time cycle. This can exact a substantial cost in terms of health and degraded performance. Understanding the circadian system, in particular its entraining mechanism, can provide us with useful solutions to these problems.

—Nayantara Santhi

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BIRTH DEFECTS

Birth defects are also termed congenital anomalies or inborn errors. While not always diagnosed at birth, they are believed to have been present at birth and have their origin in some perturbation of the normal developmental process. The causes of birth defects include genetic abnormalities inherited from either or both parents; genetic abnormalities that spontaneously arose in the individual itself; insufficiencies in the mother, such as placental abnormalities or nutritional deficiencies; maternal disease (such as diabetes); exposure to drugs or environmental factors (summarized under the term *teratogen*, and including such diverse factors as hyperthermia, alcohol, or viruses); or physical trauma during the developmental period.

Developmental defects, as the name implies, occur as a result of changes in development processes that cannot be repaired or compensated for. It is generally believed that earlier perturbations affect the developing embryo more profoundly than later episodes, with the first trimester of pregnancy being the most critical period.

In the first 7 to 10 days after fertilization, the human embryo undergoes several cell divisions, with implantation into the uterine wall marking the successful establishment of pregnancy. Contributing some of its own tissue, the embryo ensures access to nutrients through the formation of the placenta, which is a combination of maternal and embryonic tissue.

Insufficiencies in placental function profoundly affect growth and survival of the developing embryo. In rapid succession, the territories for the primordia of major tissue systems are laid down in a process that defines the overall body pattern of a vertebrate embryo. During a 4- to 10-week phase of development, which spans the events scientifically referred to as gastrulation and neutralization, embryos are most sensitive to perturbations that cause birth defects.

Highly coordinated processes of growth, movements, and interactions of cells are critical to proper formation of the primordial of major tissues and body parts and to subsequent development of each organ. Perturbations may affect groups of cells, changing their behavior, or the interactions between cells, resulting in miscommunication, or their growth, causing asynchrony. A single change can thus fundamentally influence one or more subsequent developmental pathways.

In many cases, the primary cause of the developmental defect cannot be unequivocally determined, but for genetic abnormalities, an increasing number of tests are becoming available that detect trisomies, translocations, deletions, rearrangements, and mutations. If the mutation was inherited, there is a higher risk of recurrence in future offspring.

Birth defects are classified as major and minor, generally reflecting clinical severity. Some birth defects are lethal, such as absence of the brain, malformations in brain structures (lissencephaly), severe skeletal dysplasia (thanatophoric dysplasia), or severe heart malformations or lung dysfunction as often seen with premature births. Major malformations include neural tube defects, heart defects, or agenesis of body parts that collectively affect from 1/1,000 up to several percent of births in special populations.

Minor malformations, such as vertebral anomalies, may go undetected at birth and include digit abnormalities, cleft lip or altered facial features, or internal organ defects.

A group of birth defects that may or may not be associated with physical deformities is referred to as inborn errors of metabolism. In these cases, the ability to take up and properly utilize nutritional compounds is diminished or the removal of intermediates or end products is compromised. Cognitive impairment and neural retardation, even though not always detectable at birth, also have strong developmental components, as they often reflect subtle structural abnormalities of the brain.

Blindness and deafness may also be considered birth defects insofar as they result from abnormal development of eyes and ears or inborn tendency to degenerate. Since much of the development of sensory and cognitive systems in humans occurs after birth, the term "developmental defect" rather than "birth defect" would be more appropriate.

Historically, a distinction has been made in classification of birth defects as syndromic or isolated, depending on whether a combination of anomalies was present or not. With more refined combinations of clinical and genetic diagnosis, this distinction has become less meaningful in recent years.

The incidence of certain birth defects appears to be related to maternal nutrition. It has long been recognized that the risk for neural tube defects can be reduced by supplementation of maternal diet with folic acid (folate). In many countries, it is recommended that women supplement their food intake with folate-containing multivitamins; in the United States, grain products such as flour, bread, and cereal are fortified with folic acid. However, for folate to be effective, adequate levels have to be maintained during the early pregnancy, prompting the recommendation that all women of childbearing age consume either supplemental folate at 400 mg/day through a multivitamin that contains this amount or folate-only supplements. This will ensure adequate folate supply even if the pregnancy was unplanned or not recognized early on. Yet, even though folate can lower the risk, it cannot prevent all neural tube defects. Furthermore, it has recently been recognized that folate is also beneficial in reducing the incidence of cleft lip and palate and possibly skeletal defects.

Given that birth defects are the leading cause of child mortality in developed countries, the importance of proper nutrition cannot be overstated. Exposure of the developing embryo to potential teratogens is difficult to assess, unless outcomes point to well-defined

syndromes, such as fetal alcohol syndrome. Time of exposure, intensity, and duration may affect embryonic development. In recent years, it has become increasingly recognized that fetal exposure may not only cause acute insults but also predispose to disease later in adult life. For example, maternal use and exposure to tobacco during pregnancy are associated with increased risk for respiratory disease in progeny. Similarly, maternal diabetes during pregnancy appears to predispose to susceptibility for metabolic syndrome in the offspring. A rising concern is the increasing prevalence of babies born small for gestational age or prematurely. While not a birth defect in the classical definition, developmental immaturity at birth is associated with substantially increased childhood morbidity, mortality, and disease susceptibility later in life.

Most progress in understanding the causes of birth defects has been made for anomalies caused by mutations in single genes. In these cases, the availability of diagnostic tests has enabled screening of at-risk pregnancies, although in utero prevention of already manifest birth defects is currently not possible. However, in case of continuing pregnancy and birth, early diagnosis is often critical to choosing treatment options or timely enrollment in appropriate support programs. However, it should be emphasized that even in cases of a well-known genetic origin for a given disorder, the specific manifestation may cover a range of severity from profoundly to mildly affected or even asymptomatic individuals. This phenomenon of variable expressivity and incomplete penetrance makes estimates of recurrence risks difficult. The confounding factors in this variability are of great research interest and have important implications for individual treatment and long-term care.

—Claudia Kappen

See also Infancy

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BIRTH ORDER

Alfred Adler, founder of the theory known as Individual Psychology, first introduced the concept of birth order. Adler identified characteristics of different ordinal positions, but he also emphasized the importance of psychological birth order. Adler believed that a family member's perception of his or her position within the family of origin may or may not match the actual ordinal position. For example, in a family with three siblings in which the oldest becomes chronically ill, the second born may hold typical first-born traits.

Each child's personality develops in relation to specifics of the sibling group. Or, in the case of the only child, the absence of siblings clearly impacts development. Adler saw variables such as family atmosphere, gender, and spacing among siblings as significant in the development of an individual's perceptions about birth order position. Individual Psychologists still identify psychological birth order position as well as actual position as fundamental in the development of a child's personality. The White–Campbell Psychological Birth Order Inventory was developed specifically to help clinicians and researchers identify psychological birth order position in relation to actual ordinal position.

Since the time Alfred Adler first introduced the concept of birth order, many clinicians and researchers (some of whom are not specifically related to Individual Psychology) also have influenced the development of this concept. Researchers have examined relationships between birth order and variables such as personality traits, achievement and intelligence, and interpersonal relationships. Additionally, the birth order concept has received media attention and become a popular subject in areas such as parenting education, personal growth, and intimate relationships. For example, Kevin Leman has written several popular books on the birth order concept including the relationship between birth order and selection of a mate.

While many professionals find the birth order concept interesting to use clinically and in research, specific research findings are seemingly inconclusive. Some wonder, then, Is birth order a myth or is it science? Statistically significant findings may only be difficult to interpret because of the phenomenological nature of the concept. Using psychological birth order or information about an individual's family atmosphere in relation to that person's actual ordinal position may lead to the most accurate interpretation of the meaning of birth order. For example, family dynamics to be explored that have been identified as influencing perceptions about a child's place in the family include (1) parenting styles, (2) death of a sibling, (3) miscarriage, (4) large age gaps between siblings (e.g., more than 3 years), (5) siblings with disabilities, (6) gender, and (7) divorce and step-siblings.

CLINICAL PERSPECTIVE

Helping professionals often use birth order in terms of conceptualizing, understanding, and forming insight regarding clients' lifestyles or views of themselves in the world. Researcher Alan Stewart cautions the use of birth order characteristics in clinical judgment, indicating that information regarding birth order taken out of context can lead to inappropriate conclusions. From a clinical perspective, it is helpful to learn how clients perceived their position in the family of origin and how that relates to current concerns presented in therapy. Individual Psychologists believe that the family of origin is a child's first opportunity to see him or herself in a social context. Within the family, children develop personality characteristics as well as specific social skills.

Some general characteristics have been observed as typical birth order traits. Any personality trait can have both positive and negative aspects. For instance, a high achiever is often successful in certain areas of life but may suffer from excessive anxiety. Similarly, any birth order position may create a place for strengths of character as well as weaknesses. Again, the birth order position is phenomenological, and many variables exist. However, clinicians and researchers have identified general patterns of the following birth order positions.

ONLY CHILDREN

Only children tend to be outgoing, mature, and verbally skilled. They are often surrounded by adults and therefore typically seek approval. They also may tend to expect attention, or even prefer to be the center of attention. However, being an only child can sometimes feel lonely, as there are often fewer opportunities to practice peer social skills. It makes sense that when there is only one child, that child receives all the adult attention and resources of that family. In fact, early writings about birth order position describe the only child as at risk for being overindulged or pampered. As Alan Stewart noted (2004), current research contradicts these more negative stereotypes.

FIRSTBORN CHILDREN

Firstborn children are often the example of responsible behavior for the other siblings. As the oldest in the family they typically take on the characteristics of perfection and high achievement. Firstborns tend to be characterized as organized, serious, and even bossy. As these children develop socially, they may have only a few close friends. Firstborns are thought to be more competitive and often thrive in leadership positions.

SECONDBORN CHILDREN

The secondborn child enters the family in competition with the older sibling. Often, the secondborn will develop skills or interests opposite of the older sibling in an attempt to find his or her sense of belonging within the family. Secondborn children tend to be very social, competitive, and hard working, frequently in an attempt to compete or even overthrow the older sibling. They are often less serious and less focused on academic achievement, especially when the firstborn has already taken that position.

MIDDLE CHILDREN

Middle children often feel squeezed between an older and a younger sibling, and are therefore usually concerned with fairness. Because of their middle position, these individuals are sensitive to injustices. Middle children may have more difficulty developing a sense of belonging and significance within the family. Because of these individuals' unique position within the family, middle children tend to be either skilled negotiators or instigators.

YOUNGEST CHILDREN

The youngest child in the family is typically referred to as the "baby" and never experiences feelings

of being dethroned. These individuals are usually charming and socially outgoing. Youngest have the advantage of observing and learning from the successes and failures of older siblings. Being the youngest child in a family presents an opportunity to continually be pampered by older siblings and parents, thereby developing a lack of independence or self-reliance, or to use their position to excel.

Again, while these general birth order characteristics have been observed, it is important to emphasize that family atmosphere dynamics greatly influence individual perceptions about position in the family. Still, recognizing birth order positions and typical patterns provides a greater understanding of human development. The concept of psychological birth order, which expands the ordinal position concept, enhances this understanding.

—Kelly Gfroerer and Kelli B. Ritter

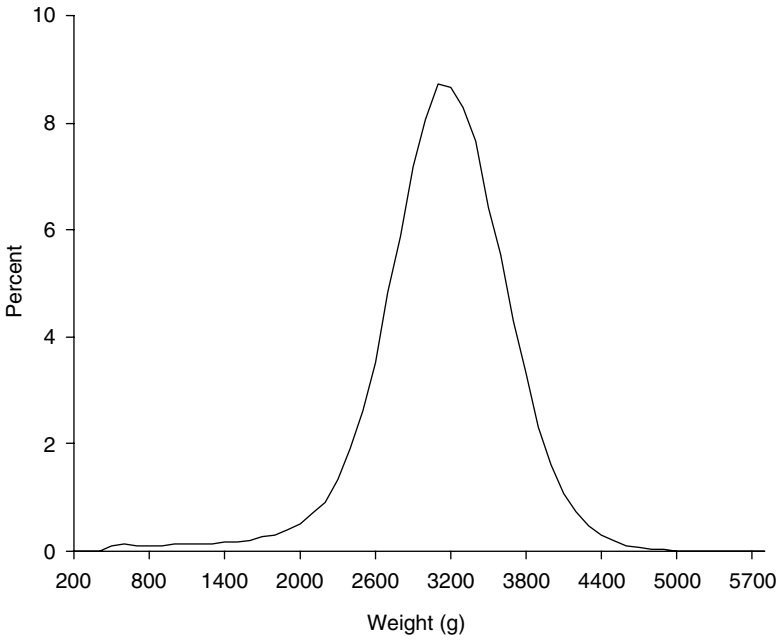

Figure 1 Birth weight distribution of 150,000 deliveries in a tertiary medical center in Israel between 1988 and 2002.

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BIRTH WEIGHT

Birth weight is the actual weight of the baby determined immediately after delivery. The average birth weight in the United States varies between 3,000 and 3,600 g, depending on factors such as race, size of the parents, and gender (boys are heavier). Birth weight distribution of 150,000 deliveries between the years 1988 and 2002 in southern Israel is shown in Figure 1, with a mean of 3,200 g. Estimated fetal weight can be calculated in utero by ultrasound, based on fetal weight percentile, according to previously established gestational age. Fetal weight increases especially during the second half of pregnancy.

Estimated fetal weight less than the 10th percentile is considered small for gestational age, which may be due to intrauterine growth restriction. Low birth weight, defined as less than 2,500 g, has contributed appreciably to neonatal morbidity including neurological and intellectual deficits. However, such morbidity exists specifically in extremely low birth weight newborns (<1,000 g). It is estimated that 3 to 10% of infants are growth restricted. An important determinant of fetal weight is inheritance, and indeed a small woman is likely to have a small baby. Socioeconomic status of the mother is an important determinant of birth weight. Socioeconomic deprivation is associated with lower fetal growth rate, basically due to smoking, alcohol, or other substance abuse and poor nutrition. Other possible causes for growth restriction are problems in the placenta (which carries food and blood to

the baby), birth defects and genetic disorders, maternal infections, hypertensive disorders, and even several toxins and medications.

Management of growth restriction includes an attempt to determine the underlying etiology, including a careful ultrasound search for malformations. Fetal karyotype should be considered if structural anomalies are present. Also, testing for infectious diseases such as rubella, varicella, CMV, syphilis, HIV, and toxoplasmosis should be performed. Obvious environmental toxins or drugs should be removed from the maternal environment. Women are encouraged to cease smoking, eat a variety of healthy foods, and achieve optimal weight gain during pregnancy, as determined by their prepregnancy weight for height. Fetal surveillance includes serial ultrasound scans and fetal heart rate monitoring. Unfortunately, interventions to improve blood flow to the uterus (including bed rest and low-dose aspirin) failed to improve fetal outcome in randomized studies.

The fetus with enhanced growth is defined by birth weight greater than the 90th percentile for gestational age. Macrosomia is a term used to describe a very large baby and is defined as birth weight of more than 4,000 g. Macrosomia can be ascribed to an exaggerated, linear fetal growth or to abnormal maternal glucose homeostasis (diabetes mellitus). This high birth weight may cause birth trauma due to a serious condition known as *shoulder dystocia*—difficulty delivering the infant's shoulder. Although complicating only 0.13 to 2.1% of all deliveries, shoulder dystocia is associated with adverse maternal and fetal outcomes. Maternal morbidity includes lacerations of the birth canal and postpartum bleeding. Fetal complications include fracture of the clavicle or humerus and neurological complications such as asphyxiation or Erb's palsy. Several clinicians investigated factors associated with shoulder dystocia in an attempt to predict its occurrence. Major risk factors documented by most studies include fetal macrosomia, maternal diabetes, obesity, and operative delivery. Diabetic patients are almost five times more likely to have a shoulder dystocia, mainly due to higher rates of fetal macrosomia, larger shoulder and extremity circumferences, and increased body fat.

Unfortunately, prediction and therefore prevention of shoulder dystocia is virtually impossible. There is no reliable way to detect macrosomia in uteri since ultrasound has a wide deviation of up to 22% in fetal macrosomia. Thus, an accurate estimate of excessive fetal size is not possible, and the diagnosis is generally made after delivery. Reduction in the time interval from delivery of the head to the delivery of the body of the baby is important for survival. Several maneuvers exist to deliver the anterior shoulder and relieve shoulder dystocia, which are familiar to the attending obstetrician. Most cases are handled successfully.

—Eyal Sheiner

See also Infancy

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BIRTHING CENTERS

Birth centers are places where women and their families can experience the joys of childbirth. They provide intensive care to the childbearing family through extensive education and offering choices throughout pregnancy, labor, birth, and the postpartum period. The philosophy is family centered, and all birth centers provide a home-like environment that offers a nurturing and protected milieu for the mother. The woman is in control at a birth center, much like being in her own home.

The modern birth center was developed in 1975 as a pilot project by the Maternity Center Association (MCA) in New York City. The MCA has a long history of meeting its goal to improve the health of mothers and its infants. Established in 1925, the MCA has initiated such innovations as developing prenatal care, establishing the first school for nurse-midwives in the United States, and promoting childbirth education.

The birth center was an innovation for women who were dissatisfied with typical hospital births that consisted of many routine interventions like shave preps, enemas, and isolation of the mother from her family. It offered safe birth care, including the ability to transfer mothers to an acute-care hospital when that type of care was necessary. For the majority of women then and now, birth is an uncomplicated physiological event that can safely take place in a birth center with a qualified attendant usually a midwife. Midwives are skilled in attending normal birth, while the hospital and physicians are reserved for the complicated cases.

Birth centers provide safe, sensitive, and personalized care. This means that time is spent with the woman and her family during the pregnancy, questions are answered, and women become partners in their care. They weigh themselves and write in their own chart. They decide who will be with them in labor.

During labor, pain relief measures used in birth centers include position changes, massage, hydrotherapy, visualization, hypnosis, and the continuous presence of the birth attendant. Continuous presence of the birth attendant has been shown to decrease the length of labor and the number of operative births. The natural process of labor is enhanced by having mothers walking, drinking, and eating lightly. The attendant midwife carefully monitors the condition of the mother and baby using intermittent auscultation of the fetal heart rate and feeling the contractions with a hand rather than relying on machines to do this very sensitive surveillance. Women birth in the position that is most comfortable for them and in the place they choose, such as the tub.

Family members are very involved with the woman in labor. They encourage her, hold her, and offer cool compresses and drinks. Siblings are often present to see the birth of the newest family member.

Extensive research has demonstrated the safety of birth centers. In 1989, the results of a prospective study of more than 11,000 women who went to birth centers for care was published in the *New England Journal of Medicine*. In addition to validating the safety of the birth center model of care, the study documented the tremendous consumer satisfaction. There are now 90 birth centers throughout the country with more in the development stages.

The National Association of Childbearing Centers (NACC) is the national organization for birth centers and has midwives, physicians, nurses, administrators, and consumers as members. NACC has developed national standards for birth centers, and the Commission for the Accreditation of Birth Centers accredits centers that meet these standards.

Birth is a joyous event, and birth centers celebrate it by providing women and their families with time-intensive, personalized care that results in a healthy baby and a new nurtured and happy family.

—Suzan Ulrich

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BISEXUALITY

The term bisexual can be used to refer either to people's sexual behavior or to their sexual identity. This distinction is made because behavior and self-selected labels do not always correspond. The prefix "bi" literally means two and is therefore used to refer to the dualistic nature of attraction to or sexual behavior with members of both sexes. In strictly behavioral terms, bisexuality indicates that an individual has had sexual experiences with members of both sexes. Based on research from the Kinsey Study on human sexuality, it is believed that as much as 28% of women and 46% of men have been behaviorally bisexual at some point in their lives. In terms of using bisexuality to refer to an individual's sexual identity, it applies to individuals who have chosen to identify, either outwardly or inwardly, as bisexual. In this case, bisexuality

1	*2*	*3*	*4*	*5*	*6*	*7*
Other Sex Only	Other Sex Mostly	Other Sex Somewhat More	Both Sexes Equally	Same Sex Somewhat More	Same Sex Mostly	Same Sex Only

Figure 1 A Continuum of Bisexuality

is believed to indicate the potential to feel attracted to members of both sexes, regardless of whether the feelings are acted upon or not. Due to the controversial nature of assuming and maintaining an openly bisexual identity, it is difficult to estimate what percentage of the population is bisexually identified.

BISEXUALITY ON A CONTINUUM

While it may be tempting to conceptualize the world as comprised of three groups, heterosexual, homosexual, and bisexual, research indicates that it is more helpful to conceive of sexual attraction and orientation as existing on a continuum, such as Figure 1, which has been adapted from Kinsey:

The area between the end points of 1 and 7 represents those who are attracted to both sexes to varying degrees. While many people assume that bisexuality must represent the exact midpoint between the two poles of exclusive heterosexuality and exclusive homosexuality, studies indicate that rarely do bisexually identified individuals perceive themselves as being equally attracted to both sexes. Rather, most self-identified bisexuals indicate that they have a clear preference for one sex over the other, often in a 40/60 split, represented by 3 or 5 on the above scale, or 30/70 split, represented by 2 or 6 on the above scale.

BISEXUAL IDENTITY DEVELOPMENT

Although a number of people may engage in sexual activity with members of both their own sex and the other sex across the life span, relatively few will choose to identify as bisexual. Also, there are some who choose to self-identify as bisexual, despite never having had sexual experiences with members of their own sex and/or members of the other sex. This raises the question of how a person comes to claim a bisexual identity if sexual behavior does not always determine identity.

While there are numerous models describing gay and lesbian identity development, there are relatively few models that define bisexual identity development.

This is believed to be reflective of the general lack of attention that has been paid to bisexuality by theorists and researchers alike, who tend to combine bisexuality with gay and lesbian identities. Bisexual identity development models are different from gay and lesbian identity development models because they tend to be nonlinear, more complex, and remain open-ended due to the fluid nature of bisexuality. The following four-stage model in Figure 2, which is based on interviews with bisexually identified individuals, was proposed by Weinberg, Williams, and Pryor in 1994.

COMPETING THEORETICAL MODELS

Conflict Model of Bisexuality

Some theorists within the fields of psychology and sex research believe that sexual orientation is dichotomous, meaning that people are either exclusively heterosexual or exclusively homosexual. This idea stems from the notion that men and women are opposites and therefore it is not possible for one person to experience attraction to both sexes. In the conflict model of bisexuality, it is believed that bisexual people are confused and conflicted over their sexual orientation, likely to be in a transition phase from heterosexuality to homosexuality, and employing the bisexual label as a defense against adopting a homosexual identity. The conflict model fits well with many of society's stereotypes about sexual orientation including the idea that any amount of same-sex attraction is indicative of an underlying exclusive same-sex orientation. Also, the conflict model reflects the suspicion and skepticism present both within mainstream heterosexual society and some gay and lesbian groups about the validity and permanence of a bisexual identity. Research indicates that while popular wisdom may hold that this model fits the majority of bisexually identified people, in reality it represents a small minority of bisexuals.

Stage 1	*Initial Confusion*	Characterized by feelings of confusion, doubt, and struggle. Sources of confusion include (1) experiencing attraction to members of both sexes, (2) recognizing that available labels of heterosexual and homosexual do not fit, (3) facing the same-sex component of one's sexuality in a homophobic world.
Stage 2	*Finding and Applying the Label*	Characterized by trying on the bisexual label and recognizing that it fits one's experience of one's sexuality. Various reasons for entering this stage include: (1) discovering that the category of bisexuality exists and fits one's experience, (2) having sexual experiences with both men and women that confirm one's feelings of attraction to both sexes, (3) deciding that there is no need to choose between a heterosexual or homosexual identity, (4) receiving encouragement and support from others for identifying as bisexual.
Stage 3	*Settling Into the Identity*	Characterized by increasing self-acceptance and decreasing concern about others' negative opinions of the bisexual label. The increase in self-acceptance is influenced by (1) receiving support from others for continuing to identify as bisexual, (2) knowledge of others who identify as bisexual, either through direct contact or reading.
Stage 4	*Continued Uncertainty*	Characterized by the ambiguity that is inherent in maintaining a bisexual identity. Many bisexuals continue to experience periods of doubt and uncertainty about their chosen identity. Sources of this continued uncertainty include (1) the lack of validation and support by the larger society, (2) the absence of bisexual role models and a bisexual community, (3) being in a monogamous relationship or otherwise not having a sexual relationship with both sexes.

Figure 2 Four-Stage Model of Bisexuality

Flexibility Model of Bisexuality

In contrast to those who support the conflict model of bisexuality, some theorists do not view sexual orientation as dichotomous, but rather as existing on a continuum (see Figure 1). From this viewpoint, it is possible to conceive of bisexuality as existing as a real and enduring identity, rather than as a pathological avoidance of one's homosexual identity. The flexibility model views bisexually identified individuals as capable of moving fluidly between same-sex and other-sex relationships. Although this model does acknowledge that a bisexual identity can result in ambivalence in some instances, it does not insist that the identity is inherently problematic as does the conflict model. The flexibility model is in keeping with the growing body of social science research that indicates that bisexuality is indeed a valid and enduring identity for some individuals.

BIPHOBIA

Simply stated, biphobia is the fear of bisexual people and the bisexual identity. Negative attitudes about bisexuality exist both within the heterosexual and gay/lesbian communities. While bisexual individuals are certainly impacted by homophobia, the fear of homosexuality, they also experience a form of oppression and discrimination that is unique to bisexuality. In addition, biphobia can come from an external source or from within. Internalized biphobia refers to the acceptance and internalization of negative messages about bisexuality by bisexual individuals. Fear

of bisexuals and bisexuality stems from and is maintained by a variety of myths about bisexuality. Myths about bisexuality include the notion that bisexuality does not exist or is merely a transition stage between heterosexuality and homosexuality, the idea that bisexuals cannot be monogamous or need to have partners of both sexes, and the belief that bisexuals are more promiscuous or are likely to leave one partner for a partner of the other sex. All of these myths translate into a general sense of distrust of bisexuals. It is important to remember that bisexuals are a diverse group of people, many of whom do not fit within these stereotypes.

SUMMARY

The notion of bisexuality may be difficult to comprehend because it does not fit within the traditional dualistic conceptualization of the world as being comprised of numerous either/or choices such as black or white, male or female and heterosexual or homosexual. Rather, bisexuality challenges traditional thinking about sex, gender, and the fixedness of sexual orientation. Bisexuality represents a real, valid, crystallized identity that is separate and different from heterosexuality and homosexuality. Nevertheless, bisexual people face discrimination and hate crimes just as gay and lesbian individuals do. Although increasingly more research is being conducted on bisexuality as a unique identity, a deficit still remains in understanding this unique population.

—Judith Conoyer Bronson

See also Homosexuality

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BMI (BODY MASS INDEX)

Body mass index (BMI) is a measure of human physical fitness that is designed to provide a standard metric for evaluating individuals' weight, relative to their height. Specifically, BMI is calculated as weight divided by height (squared), as shown below. As such, BMI can be thought of as the ratio of weight to height, per unit of height.

$$\text{BMI} = \frac{kg}{m^2} \text{ or, BMI} = \frac{lbs}{in^2} \times 703$$

Based on BMI, an individual's weight status can be classified as underweight, normal, overweight, or obese. Some professionals use an additional weight category of "extreme obesity" (or "morbidly obese") when classifying weight status.

WEIGHT CLASSIFICATIONS AMONG ADULTS

Within adult populations, healthy body mass index values range from 18.5 to 24.9. Adults with a BMI of less than 18.5 are considered "underweight." BMI values of between 25.0 and 29.0 classify individuals as "overweight," and BMI values of equal to or greater than 30.0 classify individuals as "obese." These weight classifications are based upon research findings associating higher BMI scores with increased incidence of health complications such as heart disease, diabetes, and asthma.

WEIGHT CLASSIFICATIONS AMONG CHILDREN

Although the same formula for calculating BMI is used with children and adults, the process for identifying

normal versus unhealthy growth patterns differs between populations. Because body mass index changes substantially with age, rather than using specific cutoff values, weight classifications for children between ages 2 and 20 are determined by plotting body mass values along growth charts for age and sex. Children whose BMI values fall between the 15th and 85th percentiles on BMI-for-age-and-sex growth charts are considered to be of healthy weight. Children whose BMIs fall above the 85th or 95th percentiles for their age and sex are classified as "overweight" or "obese," respectively. Similarly, individuals with BMI values below the 15th percentile are considered to be "underweight."

ALTERNATIVE METHODS FOR CLASSIFYING WEIGHT

Alternative methods exist for determining weight status including waist circumference, skin fold measurement, underwater weighing (hydrostatic weighing), and bioelectrical impedance. Waist circumference is a general method for determining unhealthy weight status and simply involves measuring a person's waist circumference. For women, a waist circumference greater than 35 inches is considered unhealthy and 40 inches is unhealthy for men. Skin fold measurement involves using a caliper device to measure the thickness of a fold of skin and its underlying layer of fatty tissue. Specific locations that are to be representative of overall body fat include back of arm, front of thigh, and lower abdomen. Hydrostatic weighing is a method where an individual's "dry" weight is obtained while wearing minimal clothing. Next, the subject is lowered into a water filled tank where they are weighed underwater. These two weights are then compared to determine the person's body fat percentage. Bioelectrical impedance uses medical technology to determine body composition including percentage of fat, muscle, and water.

WHY USE BMI?

Compared to procedures such as skin fold measurement, waist circumference measurement, underwater weighing, and bioelectrical impedance, body mass index proves to be a relatively uncomplicated, inexpensive, accurate, and reliable tool for classifying weight status. Whereas techniques such as underwater weighing and bioelectrical impedance require both extensive training and sophisticated equipment, BMI calculations require only a scale, height rod, and basic mathematical skills. Furthermore, unlike skin fold and waist circumference measurement, body mass index can be consistently calculated over time and by different people.

However, body mass index calculations are associated with a number of limitations as well. Although highly correlated with other assessment techniques for weight status, BMI calculations do not directly measure body fat percentage. BMI may overestimate body fat in individuals with higher than expected muscle mass (i.e., athletes) and may underestimate body fat percentage in individuals with little muscle mass (i.e., older adults). Similarly, BMI does not take into account the distribution of body fat within an individual, which is highly correlated with certain types of health risks. Thus, two individuals with identical BMI scores may have dramatically different body compositions.

As with any categorical system, specific values and percentiles separating healthy from unhealthy weights are, to some degree, arbitrary. That is, the prospective health status of individuals with respective BMIs of 28 (designated as "overweight") and 30 (designated "obese") is probably more similar than the different labels would suggest. Although BMI shares this fundamental problem with other measurement systems that utilize categorical systems, weight status as measured by BMI has repeatedly been shown to be a robust predictor of health problems in the research literature. Currently, BMI is one of the most widely used, accurate, and cost-effective methods for classifying weight status.

—Michael M. Steele, Heather L. Hunter, and Ric G. Steele

See also Dieting, Height, Weight

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BOWLBY, JOHN (1907–1990)

Edward John Mostyn Bowlby is, together with Mary Ainsworth, the founder of attachment theory. In this theory, Bowlby tried to explain the way in which infants establish ties with their mothers or caregivers, and he explored the emotional consequences of disrupted ties.

Bowlby grew up in a typical upper-middle-class family in London. His father, a leading surgeon, was often absent. He was cared for by a nanny and nursemaids. In 1918, he was sent to boarding school. He was further educated at Dartmouth Royal Naval College and Trinity College, Cambridge, where he studied medicine and psychology. He then worked at a progressive school for maladjusted children. This school's view that the present problems of children stemmed from adverse experiences in their families in the past struck a chord with Bowlby. To further explore this field of interest, he completed his medical studies and started at psychiatry and psychoanalysis.

From his first publication (1938) onward, the link between mother-child separation and the later personality development of the child was his major theme. In 1946, he joined the staff of the Children's Department of the Tavistock Clinic, where he remained until his retirement in 1972. Within this department, he was able to establish a research unit to examine the effects on young children of separation from the mother. One of the co-workers in this clinic was Mary Ainsworth, who later translated the basic tenets of attachment theory into empirical findings. She also developed a research instrument (the Strange Situation) for studying attachment of children to their mothers under laboratory conditions.

A breakthrough in Bowlby's career was his 1951 report on the mental health of homeless children at the invitation of the World Health Organization. This report, which was translated into 14 languages, highlighted the importance of continuing loving care by the mother figure for a young child's healthy development. He found the theoretical framework for the effects discussed in the WHO monograph in the supplementation of his analytical knowledge with ethological insights. Bowlby laid down his theory in his well-known trilogy *Attachment* (1969), *Separation* (1973), and *Loss* (1980). Bowlby's work has had (and still has) a great impact. Child care practices were improved on the basis of his ideas. Much fruitful research has been prompted by his theory. Many clinicians are finding his insights and approach useful.

—Suzan van Dijken

See also Ainsworth, Mary Salter; Attachment

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BRAIN DEATH

Advances in medicine, surgery, and public health have gradually increased the average life expectancy of the population. At the same time, patients with chronic diseases experience increased survival periods in relatively good health, leading to advanced single or only few organ failures, making them adequate candidates for organ replacement via transplantation. The accumulated knowledge and technological progress made up to the late 1950s in critical care medicine allowed physicians to artificially maintain body oxygenation and blood perfusion regardless of brain function. Simultaneously, the highly successful developments in the field of organ transplantation promoted an ever-increasing demand and need for such organs.

The first solid organs (e.g., liver, kidney) for transplantation were obtained from donors in whom cardiac and pulmonary function had ceased, otherwise referred to as cadaveric organ donors. It was soon learned that the continued cardiopulmonary function of the brain-dead donor provided healthier, blood perfused organs. This promoted deep changes, and with it controversies in the medical, ethical, and philosophical perspectives about death. Through scientific landmark achievements, medicine empowered the dead to help the living through the wonder of organ donation.

The first set of brain death criteria were the Harvard Brain Death Committee Criteria from 1968. These,

with few changes induced by newer medical development, remain the backbone for the diagnosis of brain death. In 1981, the United States Uniform Determination of Death Act established that death can occur by one of two clinical events: cessation of cardiopulmonary function or cessation of function of the entire brain. Brain death is an artificial, technologically driven, clinical condition of oxygenation of a cadaver.

For the diagnosis of brain death, clinical evidence of severe, extensive, and irreversible brain injury (metabolic or anatomic) needs to be present. Confounding factors or diagnoses that can mimic brain death need to be carefully ruled out, such as severe hypothermia or chemically induced skeletal muscle paralysis.

In the appropriate context, three clinical elements are present: coma (cessation of function of either the upper brain stem or both cerebral hemispheres), loss of reflexes from the brain stem, and inability to spontaneously breath (lower brain stem) even when a maximal respiratory challenge is provided (the apnea test).

The so-called "confirmatory" tests are only used when most of the elements for the diagnosis of brain death are present, but it is not possible to reliably satisfy all of the criteria on clinical grounds. For example, in patients with severe facial injuries or in those with advanced pulmonary disease and chronic carbon dioxide retention. These tests are classified in two subgroups: blood flow studies, such as transcranial Doppler (ultrasound), or electrical tests, such as electroencephalography. These "confirmatory" tests cannot take the place of the clinical criteria.

The diagnosis of brain death is serious and irreversible. It confirms that the person is dead. When the diagnosis is reached, the person becomes a cadaver. If the option of organ donation is not viable, all artificial means of sustaining body oxygenation and blood circulation should be discontinued.

Brain death is a difficult diagnosis for families to understand and for physicians to communicate.

—Adrian A. Jarquin-Valdivia

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BRAIN DEVELOPMENT

Humans share many similarities with other animals, including the ability to experience sensations, exhibit motor behavior, and even socialize. However, we are clearly different in many important regards. For example, unlike any other animal, humans possess the unique ability to produce and understand language, experience complex emotions, and perform higher cognitive functions. Not surprisingly, each of these abilities is under the control of the brain. What this means, therefore, is that although the human brain is anatomically comparable to the animal brain in regard to "lower" structures required for the production of basic functions, the human brain also contains "higher" structures that produce the behaviors found exclusively in humans. As such, humans possess the most highly evolved brain. This is illustrated by the fact that on average the adult brain consists of 100 billion neurons, each of which makes between 1,000 and 10,000 connections with other cells. What is perhaps even more amazing is that despite its obvious complexity, the entire human brain originates from a single cell, as does the rest of the human body. The following discussion will describe the process of human brain development, beginning at the time of conception and ending when all neurons have arrived at their appropriate target within the brain.

EARLY CENTRAL NERVOUS SYSTEM DEVELOPMENT

The human central nervous system begins to develop within 2 weeks after conception. Around this time, the single-celled embryo enters its blastulation phase, during which it undergoes a series of divisions leading to the formation of a hollow, multicelled ball called a blastula. The blastula then enters gastrulation, a process marked by the cells' reorganization into three distinct layers: endoderm, mesoderm, and ectoderm. In contrast to the blastulation phase during which the embryo simply multiplies in size, the gastrulation phase is characterized not only by continued

embryonic growth, but also by the first attempt at becoming a multistructured, multifunctional organism. This is evidenced by the fact that each of the three layers formed during gastrulation is exclusively involved in the formation of specific constituents of the human body. For example, the mesoderm gives rise to muscle, bones, connective tissue, and the cardiovascular system; the endoderm forms the gut and internal organs; and the ectoderm forms the skin and central nervous system (CNS).

Neurulation is defined by the creation of an indentation along the length of the ectoderm. It is considered the earliest stage of brain development and is complete by approximately 3 weeks following conception. During neurulation, cells on either side of the ectoderm's "neural groove" thicken to form two folds that eventually fuse to create the neural tube. The tissue of the neural tube can be divided into two regions: the ventricular zone and the marginal zone. The ventricular zone is the innermost region of the neural tube. Its region is defined by its location (which is adjacent to the neural tube's ventricle), as well as by the presence of neural and glial precursor cells (neuroblasts and glioblasts). All neuroblasts and glioblasts originate and proliferate in the ventricular zone. The marginal zone is the outermost region of the neural tube. It contains a certain type of cell of unknown origin that expresses reelin. Reelin is a substance critically required for normal cortical development and organization. Interestingly, although precursor cells neither reside nor divide within the marginal zone, they do transiently appear in this region throughout the development of the neural tube. Given the function of reelin in brain development, it is therefore likely that the transient expression of neural precursors in the marginal zone is to undergo some process necessary for normal brain development.

FROM NEURAL TUBE TO BRAIN: HOW DO PRECURSORS FULFILL THEIR DESTINY?

It is amazing that at only 3 weeks after conception the human embryo has developed to such a degree that it now contains all of the hardware necessary to create the entire human brain. What is perhaps even more remarkable, however, is that each neuron throughout the entire adult brain originates from the undifferentiated precursor cells that reside in the ventricular zone of the embryo's neural tube. What this means is that the highly specialized neurons that mediate our sensory experiences, regulate our motor behavior, influence our cognitive abilities, and affect our emotional reactions can all be traced to the confines of the relatively primitive neural tube of the 3-week-old embryo. Moreover, given that each of the above functions (as well as the thousands of others not mentioned) is generally associated with distinct brain regions, the question arises: How is it that these cells find their way to their ultimate destination?

During the development of the neural tube, special cells called radial glia are also formed. The sole purpose of radial glia is to guide neuroblasts to where they are destined to belong. This is evidenced by the fact that radial glia are transiently expressed. During brain development, they are found in abundance. Once neuronal migration is complete, they essentially disappear. Like all neurons and glia, radial glia are also birthed and proliferate in the ventricular zone of the neural tube. However, radial glia are unique in that their fibers extend all the way to the pial surface of the neural tube, thus forming a scaffold-like structure. This scaffold provides a means by which neuroblasts can migrate from the ventricular zone to their final destination.

Neuroblasts do not simply attach to radial glia and blindly migrate out, however. Instead, they partake in an active process mediated by both genetic as well as environmental factors. Although each neuroblast is genetically predisposed to become a specific type of neuron, it ultimately reaches its destination by processing chemical information in the extracellular environment during its journey. The acquisition of chemical information is made possible by the unique morphology of migrating neuroblasts whose axon and dendrites have extensions called growth cones. Growth cones contain chemically sensitive receptors and tiny, finger-like structures called filopodia that are used to pull the cell along the radial glia. During migration, the neuroblast is either chemically repelled or attracted to specific locations. Following these signals, it uses its filopodia to move along the radial glia toward the target to which it is attracted. Brain development is often referred to as occurring in an "inside-out" fashion in that the oldest neurons are located more deeply within the brain while the newest ones are found at the surface. This is because the first neuroblasts to migrate from the ventricular zone journey only a short distance before reaching their final target. As more new neuroblasts are birthed, they travel over all previous progenies to reach their targets, until the final set of neuroblasts arrives at the outermost layer of the brain.

THE INFLUENCE OF NEURAL COMMUNICATION ON BRAIN DEVELOPMENT

Once the neuroblast reaches its final destination, it is considered a neuron and defines itself as such by differentiating into the specific type of neuron it is determined to be. That is, it becomes a sensory neuron if it is destined to be involved in a sensory process or a motor neuron if it is destined to perform motor behavior. Arrival at its target also causes the neuron to seek out contact with other cells. This contact is achieved through the creation of synapses (synaptogenesis). A synapse is the tiny gap between neurons (neurons do not touch) and is the fundamental process by which information is communicated from cell to cell. Early in development, neurons send projections to a very general region and synapse with many more cells than is necessary. As the brain continues to develop, some synapses (the appropriate ones) are used more than others. This frequent communication between two neurons leads to the strengthening of that particular synapse and makes the connection more likely to be maintained. In contrast, those synapses that are rarely used become "pruned" away. The result of this process is a very precise connection from one neuron to another. Behaviorally, this process can be illustrated through the examination of infant motor development. For example, early in infancy when babies reach for objects, they often overshoot their target. However, with repeated attempts over time, their reach becomes more skilled and precise. The process by which synapses are maintained can also be illustrated morphologically. For example, although the adult human brain is greater in both size and weight than the developing brain, the developing brain actually contains many more neurons and synapses. This occurs because as the brain develops some regions lose as many as 80% of the cells that inhabit the region through the process of apoptosis (programmed cell death). Incidentally, apoptosis is regulated by a number of factors, one of which is the failure of the neuron to make appropriate synaptic connections. Presumably, if a neuron does not receive sufficient connectivity from other neurons it is not critically required for normal brain function. As such, it commits a sort of cell suicide in order to ensure that it does not get in the way of other activity.

SUMMARY

Human brain development is truly an awesome process. From its origins of the ectoderm of the gastrula, to its evolution into a multibillion-celled organ, the brain develops in a tightly regulated process under heavy genetic as well as environmental control. Despite our vast understanding of the human brain, the fact that we are continually learning more about it and its processes is alone testament to its complexity. Clearly, scientists for years to come will continue to be amazed by the human brain.

—Angela M. Sikorski

See also Brain Lateralization, Brain Plasticity, Frontal Cortex, Structural and Functional Brain Imaging

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BRAIN LATERALIZATION

The two hemispheres of the human brain are anatomically and functionally asymmetric.

ANATOMICAL ASYMMETRY

Anatomical differences between the two hemispheres are observed in gross sulcal and gyral patterns

and size. The left Sylvian fissure is often more branched, longer, and horizontal than the corresponding structure in the right hemisphere (RH). The planum temporale (PT), associated with language processing, is larger in the left hemisphere (LH) in two thirds of the population. In addition, the posterior portion of the superior temporal gyrus (area Tpt) is generally larger in the LH, and its size is correlated with that of the PT. Primary auditory cortex (Heschl's gyrus) commonly contains a double gyrus in the RH, but not in the LH. There are also known neurochemical asymmetries, with greater abundance of dopamine receptors in the LH and that of the noradrenergic receptors in the RH. Such chemical asymmetries may play a role in lateralized functions.

Lateralized Functions

In the majority of right-handers, the LH is specialized for syntactic and semantic aspects of language, whereas the RH seems to be specialized for spatial and affective processing including associative learning to emotional stimuli. Lesions in Broca's area in the left frontal cortex disrupt language production and syntax. Lesions in Wernicke's area in the left temporal cortex disrupt semantic processing. The role of the RH in language processing lies in prosody and pragmatics. The RH is also specialized for spatial attention, vigilance, and arousal. Visuospatially, the LH is more sensitive to high spatial frequencies (e.g., fine-grained features) whereas the RH is sensitive to low spatial frequencies (global, holistic form) with an advantage in face recognition and discrimination.

ROLES OF DEVELOPMENT AND GENDER

Anatomical differences between the LH and RH are evident in the fetal Sylvian fissure and PT after the gestational midpoint, and rates of hemispheric growth alternate. Following the initial predominant growth of the RH in the first 6 months after birth, a period of predominant LH growth continues for the next 4 to 5 years, which includes the critical period for language acquisition. Handedness, a reliable behavioral signature of hemispheric dominance, is not completely established until about 7 to 12 years of age, but hand or side preference is usually consistent from infancy. Laterality in part is modulated by gender primarily through the effects of testosterone during gestation. Both sexes are exposed to testosterone, but the exposure is greater in males. Testosterone may delay the development of the Sylvian fissure and Wernicke's area, thereby favoring earlier development of the RH in males. Some studies have reported increased right-handedness and spatial abilities and reduced verbal abilities in males than in females, and these functional sexual dimorphisms may be subsumed by differential gestational exposure to sex hormones. RH cortical thickness is also greater in males than in females.

OTHER SPECIES

Brain lateralization may not be specific to humans but is more extreme in our species. Larger LH areas, especially the regions homologous to the human PT and the left inferior frontal gyrus operculum (Broca's region), were observed in the majority of chimpanzees studied. Additionally, captive chimpanzees show LH dominance in approximately two thirds of behaviors studied. LH dominance is also pronounced in the orangutan. Some species of birds and fish also show evidence of asymmetry, often biased toward the LH.

—Bradley Folley and Sohee Park

See also Brain Development

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BRAIN PLASTICITY

Brain plasticity refers to the observation that both the structure and function of the brain are molded by experience much in the way that plastic is shaped by a manufacturer to suit various demands. Brain plasticity occurs during development of the nervous system, when we learn, and in response to injury. This plasticity is manifested not only by neurons, the principle information-processing cells of the brain, but also by supportive elements including glial cells and the cells that comprise the vascular networks of the brain.

DEVELOPMENTAL VERSUS ADULTHOOD PLASTICITY

Greenough and his colleagues (1987) have proposed that plasticity in the developing and adult nervous system is similar in form but different in expression. During development, they note that there is a massive overproduction of neurons and synapses (connections between neurons) that are later pruned by experience. They propose that this type of plasticity may be characterized as "experience-expectant." That is, the nervous system has been programmed by our genes to display an exuberant growth of connections at particular points in time (e.g., eye-opening) in anticipation of experiences that are common to the species. For example, all humans can expect to be born into a world that is visually rich. Our genes, therefore, direct visual centers of the brain to be created in which there are neurons capable of processing visual information (shape, color, movement). However, our genes do not know which type of visual information we will encounter, so the system is programmed to account for all possibilities. Once we open our eyes and start to examine our visual world, the brain prunes away those extra connections and neurons that are not necessary in our particular environment. If we were born into an environment that lacked horizontal lines, our nervous system would retain those neurons and synapses that process vertical lines, color, and movement but would remove those that are responsible for encoding horizontal lines. In contrast, "experience-dependent" plasticity occurs in adulthood in response to novel situations. Plasticity in this case is manifested by smaller bursts of new synaptic growth within localized regions of the brain that is then pruned by the continuing experience. For example, an adult that learns to play the piano would add new synapses in motor regions of the brain that control finger movement. As the adult becomes more practiced, some of these new synapses would be pruned away, leaving only those that provide for coordinated movement.

EXPERIENCE-INDUCED PLASTICITY OF NEURONS

Studies of brain plasticity indicate that characteristic changes include alterations of neuronal number, cell body (soma) size, dendritic extent and morphology, composition of the cellular membrane, and connectivity with other neurons (synapses). For example, several reports indicate that animals engaging in prolonged exercise exhibit increased neuronal proliferation (neurogenesis) and survival in the hippocampus. Other studies have consistently reported that the rearing of animals in an enriched environment produces substantial increases in brain volume (around 25%). This increase is distributed across areas of the brain (motor cortex, visual cortex, cerebellum) but is largest in visual cortex. Subsequent studies have indicated that this volume increase is accompanied by increases in the size of dendritic trees, increased numbers of synapses per neuron, and changes in the shape of presynaptic and postsynaptic elements.

A MODEL OF BRAIN PLASTICITY

Many neuroscientists have hypothesized how experience might promote brain plasticity and modify neuronal output. One of the most influential scientists was Donald O. Hebb, who proposed that the ability of two neurons to communicate with each other should be strengthened if those two neurons are repeatedly active at the same time. A physiological demonstration of this phenomenon was discovered in the early 1970s by Bliss and Lomo and was termed "long-term potentiation."

Long-term potentiation (LTP) is a long-lasting increase in the excitability of a cell following a high frequency burst of stimulation. Many neuroscientists believe that LTP is a good model for the electrophysiological and structural changes that occur during development and in response to learning. It has most often been studied in the hippocampus, a brain structure strongly believed to play a role in learning and memory. In the hippocampus, LTP occurs when stimulation of afferent pathways causes release of the neurotransmitter glutamate. Glutamate binds to receptors (protein docking sites) on the postsynaptic neuron. Binding of the neurotransmitter opens ion channels that then permit sodium to enter the cell. Movement of the sodium ions into the cell induces a change in the membrane voltage of the neuron. This voltage change in the membrane, if sufficiently large, promotes the expulsion of an ionic blockade by magnesium of a second type of neurotransmitter receptor known as the NMDA receptor. Following the removal of the magnesium blockade, the neurotransmitter glutamate can freely bind to the NMDA receptor and open ion channels for calcium. Increased intracellular calcium triggers a cascade of events including the activation of enzymes that modify existing cellular proteins and that also trigger the synthesis of new proteins. Collectively, these events promote increases in neurotransmitter

release from the presynaptic neuron as well as postsynaptic changes in the composition of the membrane and dendrites (e.g., exposure and/or creation of more glutamate receptors, the formation of more synapses, or larger synapses). The net effect of these events is a relatively permanent change in the excitability of the neuron. For example, hippocampal LTP induction is associated with a 100% to 200% increase in the size of extracellularly recorded field potentials in as little as 10 to 15 minutes after the application of the tetanus. This increase in field potential amplitude is long lasting.

VASCULAR PLASTICITY OF THE BRAIN

The primary focus of morphological studies of brain plasticity has centered on changes in the quality or quantity of synaptic connections. Recent investigations, however, have observed that the growth of new blood vessels from existing capillaries, or angiogenesis, occurs in response to behavioral manipulations that involve extensive physical exercise. In these studies, rats were trained on a running wheel for 30 days and the cerebellar cortex and motor cortex were dissected and the density of capillaries was determined. These investigations found that capillary density increased approximately 25% in the exercised rats compared to inactive controls. This demonstration of angiogenesis in the adult mammalian brain is especially significant given that early reports suggested that cortical angiogenesis in the rat is complete by 21 days of age. More recent reports of cerebral cortical angiogenesis in adult rats placed in complex environments, undergoing exercise, or exposed to hypobaric hypoxia indicate that the capacity for cortical angiogenesis, while diminishing with age, continues at least into the second year of life in the rat.

PLASTICITY FOLLOWING INJURY

Plastic changes following damage to the brain are robust. Most CNS neurons attempt to regenerate but typically fail. This failure results in part from the actions of glial cells which show a marked plastic response to brain injury. For example, astrocytes, oligodendrocytes, and microglia rapidly proliferate at the site of injury. Astrocytes and oligodendrocytes both release proteoglycans that inhibit axon regeneration. Activated microglia provide a permissive environment. They release neurotrophins. However, their actions cannot overcome the inhibitory effects provided by the other cells.

Many neuroscientists draw a parallel between mechanisms of recovery of function following injury and the plasticity associated with learning and memory. For example, a now classic study by Raisman and Field examined the synaptic contacts onto septal neurons. Septal neurons receive afferent information from the fimbria and medial forebrain bundle. These inputs make approximately equal numbers of synaptic contacts onto septal neurons. In their experiment, Raisman and Field lesioned one or the other of the inputs and counted synapses over a period of time. They found that, within 1 or 2 days of the lesion, synaptic contacts onto the septal neurons decreased by about 50% (commensurate with axon degeneration of the cut pathway). But, over the course of several weeks, the synaptic numbers once again approached normal levels. They determined that the new synaptic contacts were coming from the pathway that was not lesioned. In other words, neurons from the intact path were sprouting axonal branches and making additional synaptic contact with the septal neurons. This process is known as *collateral sprouting*. This was a landmark study in that it was the first to demonstrate that nondamaged areas of the brain try to compensate for damage.

More recently, this idea of compensation has been examined in the somatosensory cerebral cortex. Michael Merzenich and his group have carefully mapped the topography of the hand onto the somatosensory cortex. In one study, they either lesioned a sensory nerve of one of the fingers or removed the finger and recorded the neural activity from the cortex. They expected to see diminished activity in the region of the cortex that had just lost its input from the finger. Instead, they found that the cortex displayed neural responses to stimulation of parts of the hand adjacent to the damaged nerve or removed finger. This observation is consistent with the idea that adjacent portions of the body make synapses in their own area of the cortex as well as adjacent portions, but that the synapses that are formed in adjacent areas are repressed. When the finger information is removed, a short-term plastic change occurs that removes the repression associated with synapses from the adjacent parts of the cortex. In other words, the motor maps for adjacent portions of the body have expanded or taken over the functions of the denervated cortex. Further, Merzenich's group reports that over the course of a month or two, axons in adjacent regions of the cortex sprout collaterals that will more fully innervate the denervated region. The consequence of this is that adjacent body parts become more sensitive to stimulation.

Subsequent studies have indicated that the plasticity associated with collateral sprouting follows Hebbian rules; that is, synaptic formation and strengthening are dependent on correlated activity in pre- and postsynaptic neurons. Further, this mechanism appears to be dependent on activation of the NMDA receptor and calcium influx.

—Rodney A. Swain

See also Brain Development

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BRAZELTON, T. BERRY (1918–)

T. Berry Brazelton's role as researcher, clinician, and advocate for parents has been one of the formative influences in pediatrics in the United States for over 50 years. He was born in Waco, Texas, on May 10, 1918, and graduated from Princeton in 1940. In 1943 he graduated from the Columbia University College of Physicians and Surgeons in New York City, where he accepted a medical internship. In 1945 he moved to Boston to serve his medical residency at Massachusetts General Hospital before undertaking pediatric training at Children's Hospital. His interest in child development led to training in child psychiatry at Massachusetts General Hospital and the James Jackson Putnam Children's Center. He was a Fellow with Professor Jerome Bruner at the Center for Cognitive Studies at Harvard University. There, the process of integrating his dual interests—primary care pediatrics and child psychiatry—culminated in 1972, when he established the Child Development Unit, a pediatric training and research center at Children's Hospital in Boston.

Dr. Brazelton was one of the pioneers in newborn behavioral research. In 1973, he and his colleagues developed the *Neonatal Behavioral Assessment Scale* (NBAS), widely acknowledged as the most innovative and comprehensive assessment of newborn behavior (Brazelton, 1973; 1985; Brazelton & Nugent, 1995). The NBAS has been used in hundreds of research studies to assess the effects of a wide range of pre- and perinatal influences on newborn behavior. It has been used in cross-cultural studies and as a method of intervention to help parents understand and relate to their infants.

While Dr. Brazelton continued his daily pediatric practice, he taught pediatric residents, conducted research, and frequently appeared before Congressional committees in support of parental and medical leave. Like Benjamin Spock, to whom he has been compared, Dr. Brazelton's many books for parents and his television show *What Every Baby Knows* have influenced the beliefs and practices of parents everywhere. His classic book *Infants and Mothers* focused on the nature of individual differences in behavior and was characterized by a deep respect for parents' own decision-making abilities. He has published many other books for parents, more recently the *Touchpoints* and *Brazelton Way* books.

Dr. Brazelton is Clinical Professor Emeritus of Pediatrics at Harvard Medical School and is Professor of Psychiatry and Human Development at Brown University. In 1995, Harvard University Medical School established the T. Berry Brazelton Chair in Pediatrics. Dr. Brazelton is still actively involved with The Brazelton Touchpoints Program, a preventive outreach program that trains professionals to better serve families of infants and toddlers.

—J. Kevin Nugent

See also Infancy, Reflexes

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BREAST CANCER

Despite considerable advances in diagnosis and treatment in the past few decades, breast cancer remains a significant public health concern. Over 210,000 new cases are diagnosed in the United States annually, making it the most common type of cancer in women. It is predominantly a disease of women, with estimates that one in seven women will develop some form of breast cancer during their lifetime. Although not unknown in men, it is far less common. Approximately 1,300 men in the United States develop breast cancer each year.

A basic introduction to the medical aspects of breast cancer will be provided first. Breast cancer will be described in terms of its biological pathology and symptoms. Genetic, behavioral, and environmental risk factors for breast cancer will be discussed, along with methods of diagnosis and treatment. Equally important are the psychological stresses associated with breast cancer: the initial discovery of a lump in the breast, waiting for biopsy results, undergoing treatment, and facing the possibility of recurrence. The psychological impact of diagnosis, along with factors that promote successful adjustment, are reviewed. The topic concludes with a discussion of promising future directions for the care of both medical and psychological health.

MEDICAL ASPECTS OF BREAST CANCER

What Is Cancer?

Normally, cells in the body divide in a controlled manner to allow normal growth, replace dead cells, or heal an injury. Genes control the cellular mechanisms responsible for keeping cell division in check, but when a cell's genes mutate or become damaged, cells can begin to divide uncontrollably. In the breast tissue, unchecked cell growth can form masses (tumors). *Benign* tumors do not spread and are not life-threatening. In contrast, *malignant* cancerous tumors can grow and spread. Tumors are referred to as in situ (in place) when they remain confined to localized masses, or invasive when cells that are capable of breaking away from the tumor invade surrounding tissue or spread throughout the body by traveling in the bloodstream or the lymphatic system. The spread of cancer cells to other parts of the body (e.g., the liver or brain) is referred to as *metastasis*. However, when breast cancer cells are found in other body areas, it is still considered breast cancer. Breast cancer becomes life-threatening when metastases disrupt vital functioning in other areas of the body (e.g., the brain).

Types of Breast Cancer

Breast cancer types can be distinguished based on the location of the original tumor. Ductal carcinoma, the most common form of breast cancer, describes cancer occurring in the milk ducts. Cancer occurring in the glands of the breast where milk is produced is referred to as lobular carcinoma. Ductile and lobular carcinoma can be either in situ or invasive. The most common symptom is the formation of a painless lump in the breast or underarm area. Less common symptoms include change in the size or shape of the breast, distortions in the breast near the surface of the skin (e.g., puckering), and inversion, tenderness, or abnormal discharge of the nipple.

Inflammatory breast cancer is a less common, invasive form of the disease in which dispersed groups of cancer cells obstruct the lymphatic system in the breast, leading to symptoms such as swelling or a red, rash-like appearance on the breast. Tubular carcinoma is a form of invasive ductile carcinoma involving the proliferation of microscopic structures called tubules. Symptoms of tubular carcinoma resemble those of ductal and lobular cancer, but are associated with more favorable prognoses. Paget's disease of the nipple occurs when a carcinoma elsewhere in the breast spreads and affects the nipple and areola. This form of cancer often results in crusting or flaking; itching, burning, and redness; or bleeding and discharge from the nipple.

Causes of Breast Cancer

The specific causes of breast cancer are not yet known, but there are a number of genetic, environmental, and

behavioral risk factors known to be associated with increased risk. Being female is the strongest risk factor. Age is also a prominent risk factor. Women in their sixties are 80 times more likely to develop breast cancer than when in their twenties. Another risk factor is the possession of a mutated form of a gene referred to as BRCA. These mutations occur in less than 1% of the population, but are associated with up to an 85% likelihood of breast cancer occurrence by age 70. However, BRCA mutations account for less than 10% of breast cancer diagnoses. A woman's risk for breast cancer is increased two- to fivefold if she has a family history of breast cancer, particularly in first-degree relatives who developed cancer before menopause. Prior in situ or invasive carcinomas also increase the risk of developing future breast cancers, as do precancerous masses that can develop into malignancies. To a lesser extent, a greater number of reproductive cycles a woman passes through and hormone replacement therapy are also risk factors, as they increase lifetime exposure to reproductive hormones that can damage genes, alter cell growth, and promote the growth of certain cancers. Other potential risk factors are less clear. There is some evidence that obesity, alcohol use, and use of oral contraceptives may slightly increase one's risk for breast cancer, but the research is not strong to support these as risk factors.

What Doesn't Cause Breast Cancer

Breast cancer is not caused by a virus, bacteria, contact with someone with cancer, injury to the breast, or surgery. Through the years, a number of myths have perpetuated about potential causes of breast cancer. Some are based on initial research that appeared promising but does not hold up in better-controlled studies. A cancer-prone or "type C" personality has been proposed, characterized by compliance, a hopeless attitude, and difficulty expressing emotion. The mechanism by which personality might influence the development of cancer is unclear, and little support has been found for this claim. Similarly, high life stress as a causal factor has not been supported by recent research. Other myths have no clear basis in scientific research. There is no evidence, for example, that the use of underarm deodorants or wearing bras can cause breast cancer. In recent years, the explosion of unregulated information on the Internet has propagated unscientific or fraudulent claims of causal factors. Although the Internet can be a useful source of information, readers are strongly recommended to focus on credible, well-known sites (e.g., the American Cancer Society at http://www.cancer.org).

Diagnosis

Most breast cancers are detected either through breast examinations or breast-imaging techniques. Breast examinations involve manually checking the breast tissue for lumps. Available imaging techniques include CAT scan, MRI, ultrasound, and mammography. The most common of these is mammography, an X-ray of the breast, which can identify about 90% of breast cancers, even in women with no symptoms. In combination, mammograms and breast examinations can increase the likelihood of early detection of breast cancer, which can improve the chances of successful treatment. The final stage of diagnosis, the biopsy, involves examining the tissue mass (obtained either surgically or through a needle) under a microscope to determine whether it is benign or malignant. Approximately 80% or more of biopsies reveal that the mass in question is benign. If malignant, the biopsy can also determine whether or not the growth of the tumor is promoted by the reproductive hormones estrogen and progesterone.

Prognosis

The severity of a breast cancer is described by classification into stages, based on the size of the tumor, the involvement of the lymphatic system, and whether or not metastasis has occurred. Stage 0 breast cancer refers to an in situ tumor and is often called precancerous. Stage I breast cancer describes a tumor of less than 2 cm that has not invaded the lymphatic system or metastasized. A designation of stage II requires that a tumor be either between 2 and 5 cm or that cancer cells have spread to the lymphatic system of the same breast but have not metastasized. Stage III is designated when a tumor exceeds 5 cm and involves the lymphatic system of the same breast. Stage IV breast cancer indicates that metastasis has occurred. More advanced stages of cancer are associated with a poorer prognosis and require more aggressive treatment. Statistics show that the percentage of women who survive breast cancer for at least 5 years following diagnosis decreases by stage (stage 0, 100%; stage I, 98%, stage II, 76–88%; stage III, 49–56%; stage IV, 16%).

Treatment

Treatment of breast cancer has improved greatly during the past three decades. Several methods of treating cancer exist, and they are often used in conjunction with one another rather than individually. Most breast cancer patients undergo surgery to remove the tumor, often along with a sample of the lymph nodes. Smaller tumors (e.g., stage I or II) can usually be removed with a technique called *lumpectomy*, which conserves the cosmetic appearance of the breast. Larger or dispersed tumors sometimes necessitate a *mastectomy* (removal of the entire breast). Side effects of surgery include infection risk, pain, cosmetic disfigurement, and fatigue.

Additional treatments that supplement surgery, called *adjuvant* treatments, are often used to destroy residual cancer cells or metastases. Common adjuvant treatments include chemotherapy, radiation therapy, hormone therapy, and immunotherapy. These treatments can reduce the size of a tumor and are sometimes given before surgery is performed, in which case they are referred to as *neoadjuvant* treatments. Chemotherapy is the administration of drugs that destroy rapidly dividing cells, such as cancer cells. The drugs can be administered in pill form, as an injection, or intravenously. Duration and frequency of treatment depend on the type and stage of cancer. A major side effect of chemotherapy is that it destroys rapidly dividing cells in other areas of the body, including hair follicles and the mouth, often resulting in hair loss and mouth sores. Nausea, fatigue, pain, fertility problems, and cognitive difficulties are other potential side effects.

Radiation therapy involves exposing cancer cells to radiation in order to curb their growth. This is done by directing an external beam of particles towards the tumor or by implanting a pellet of radioactive material near the tumor. External radiation treatments are usually administered for up to 30 minutes daily for several weeks, depending on the particular case. Because radiation directly targets the tumor, adjacent normal tissue is not damaged. However, radiation therapy often produces dry or itchy skin, sunburn-like pain near the target site, darkening of the skin, and fatigue. Chemotherapy and radiation are both effective in reducing intermediate term (e.g., 5- or 10-year) recurrence and death rates by up to 15% relative to surgery alone, but the effectiveness varies by cancer type and stage. Yet, even with treatment, breast cancer recurs in approximately 4 to 7% of patients within 5 years of treatment.

Certain types of breast cancers grow faster in the presence of estrogen and progesterone. These cancers are often treated with hormone therapies, drugs that block the production and activity of estrogen and progesterone. This treatment can be effective in shrinking or slowing the growth of a hormone-responsive tumor but can have menopause-like side effects, including hot flashes and fluid retention. Hormone therapy may also produce nausea, visual disturbances, or vaginal bleeding or discharge. Five years of hormone therapy has been shown to decrease recurrence rates by 12% and increase survival rates by 4%, 10 years posttreatment. Another less common treatment is immunotherapy. Manufactured immune system components (antibodies) are injected into the blood stream, with the goal of boosting the body's natural ability to identify and destroy abnormal cancer cells. Studies show that some immunotherapy drugs increase 1-year survival rates by 11%, above and beyond chemotherapy.

Several complementary or alternative treatments for breast cancer exist. Some believe that a nondairy, high-fiber diet rich in fruit and vegetables may help fight breast cancer. Naturopathic and herbal medicine may also be useful, and a variety of herbs and nutritional supplements may improve one's prognosis. For example, antioxidants may increase the effectiveness of chemotherapy treatments. Mind/body techniques, such as hypnosis and meditation, attempt to exert mental control over treatment side effects and the natural physiological processes that fight cancer. Acupuncture and Reiki are Eastern alternative treatments that treat cancer by redirecting the flow of energy in the body. Many women find psychological benefits from complementary/alternative treatments. However, rigorous research on the benefits of such treatments for physical or psychological health is lacking.

PSYCHOLOGICAL ASPECTS OF BREAST CANCER

Stress Associated With Breast Cancer

Breast cancer can bring with it a large amount of stress, including financial strain, disabling side effects of treatment, the impact of cancer on loved ones, and the frightening possibility of death. For some women, the initial weeks following diagnosis are a time of tremendous uncertainty and psychological distress. Upon receiving the diagnosis, many experience disbelief,

shock, fear, or anger. Some may even blame themselves for their cancer, thinking that they somehow put themselves at risk by living an unhealthy lifestyle. Receiving a diagnosis of breast cancer may be especially distressing for men, as they may feel shameful having a disease in a part of the body associated with femininity. Approximately 30% to 40% of patients develop symptoms of anxiety and depression shortly following diagnosis. Recent studies have found that about 3% of breast cancer patients develop posttraumatic stress disorder (PTSD), an anxiety disorder characterized by recurrent intrusive thoughts and emotional distress following a severe trauma. Those that do not develop clinical levels of anxiety or depression often manifest some symptoms of these disorders, such as negative mood, persistent uncontrollable worry, hopelessness, or sleep disturbances.

Treatment demands can be a considerable source of stress. Those with limited financial resources or without medical insurance face the strain of financing medical care or loss of income. Other stressors involve the side effects of treatment itself. The perceived or actual disfigurement resulting from mastectomy can disturb a patient's self-esteem and body-image. For example, a woman may feel that because she has lost a breast, she is less feminine or less sexually desirable to a partner or spouse. For this and other reasons, treatment for breast cancer can interfere with a patient's ability to experience intimacy and sexuality. The side effects of some adjuvant treatments, as well as the time demands of attending frequent treatment sessions, can interfere with a patient's ability to work professionally and domestically.

For most patients, the psychological distress associated with breast cancer decreases in the months following diagnosis. However, the course of distress differs among individuals, and some experience considerable distress long after treatment. Some aspects of breast cancer, such as the fear of recurrence, can continue to induce psychological distress.

End-of-Life Issues

Patients with a terminal prognosis face an array of challenges. These include saying goodbye to loved ones, settling their affairs, overcoming their fears of pain or loss of control, and the uncertainty of death. Many people dying from cancer also worry that their death will create emotional, financial, and social hardships for their loved ones. Patients often struggle with decisions about further medical care. Once curative efforts fail, a delicate balance must be found between prolonging life with further treatment and maintaining quality of life through palliative care focused on pain management. Patients can receive palliative care in a hospital, at home, or in assisted-living facilities. Life-prolonging adjuvant treatment, pain management, emotional and informational support, and other services are typically offered.

Benefit Finding

Despite the negative psychological consequences of breast cancer, it is clear that some patients can identify positive aspects of their experience with the disease. Patients may find that struggling with breast cancer forces them to call upon personal resources of which they were previously unaware, or that they are more resilient than they had expected. Cancer may have brought them closer to loved ones or strengthened their religious or spiritual convictions. Breast cancer may even reorder one's priorities about life. The identification of such benefits allows patients to grow from their experience with breast cancer.

Predictors of Psychological Adjustment

Surprisingly, the severity of the cancer or the types of surgical or adjuvant treatments are not good predictors of distress levels. In contrast, age and educational level are among the most consistent predictors of levels of distress. Older and more educated women generally experience less distress and better overall adjustment than younger women. These groups of women tend to have an improved ability to cope with the stress associated with the diagnosis and treatment, which may account for better well-being.

The ways a patient thinks about her cancer experience also predicts psychological adjustment. Optimism, or a general predisposition toward hopefulness and expectation of positive outcomes, is related to positive adjustment. It is important to distinguish realistic from unrealistic optimism (i.e., Pollyanna-ism), which may lead one to disregard important health information or lower one's motivation to engage in health-promoting behaviors. Women with a realistic, optimistic attitude tend to experience quicker recovery from health problems in general and less distress related to having breast cancer. Other benefits include better satisfaction with

one's sex life posttreatment and lesser occurrence of negative intrusive thoughts and fears.

A related personal characteristic associated with better adjustment has been termed "fighting spirit," described as a belief in the ability to fight, conquer, and recover from breast cancer. Some researchers believe that fighting spirit may lead to better physical recovery, although evidence is mixed regarding its association with prognosis and survival. In contrast, blaming oneself for the development of breast cancer can impede adjustment, particularly in the months following diagnosis. The strength of one's coping skills also predicts adjustment. Women who actively cope with the illness (e.g., by making appointments, seeking information, and dealing with their emotions) tend to show better adjustment than those who use more avoidant coping strategies (e.g., not answering the phone, missing appointments). Benefits can also come from the ability to find meaning in the experience of cancer. Over time, patients who are able to find meaning in their illness often experience less anxiety, less depression, and higher self-esteem than those who are unable to find meaning in their experience.

Social relationships can provide considerable benefit to a breast cancer patient. Social support can be provided by a spouse, neighbors, co-workers, friends, church members, or other acquaintances. Studies show that the availability of emotional support (i.e., having someone to confide in, vent to, or rely on to boost one's self-esteem) can significantly enhance the well-being of breast cancer patients. Practical support is also important, such as the availability of someone to give the patient a ride to the hospital, pick the children up from school, or provide financial assistance. For many patients, an important source of social support comes from their religious or spiritual community. In general, religious or spiritual beliefs can contribute to enhanced quality of life, lower anxiety, better self-esteem, and the ability to find positive meaning in the cancer experience.

Breast Cancer and the Family

The diagnosis and treatment of breast cancer can also significantly challenge an individual's social network. The immediate demands of diagnostic procedures and surgery, combined with the chronic demands of adjuvant treatments, can significantly impact a patient's ability to maintain social roles within a household or maintain outside employment. Breast cancer often leads to significant distress in spouses, family members, and friends, who must face the potential loss of a loved one and unexpectedly assume the role of caregiver. The level of distress in spouses of breast cancer patients is generally quite similar to the level of distress in the patient. However, following completion of treatment, spouses and other family members may feel ready to have life return to "normal" and may be frustrated by the patient's continuing support needs.

Breast cancer, like most serious illnesses, requires a rearranging of roles within the family, as family members may need to take over many of the tasks previously the responsibility of the patient. The family may have a difficult time adjusting to the unexpected changes that arise as a consequence of the treatment of breast cancer and may even harbor resentment toward the patient for becoming ill. For families of patients in the terminal stages of breast cancer, psychological distress may be especially high. These families face a number of burdens, including managing the care of a terminally ill loved one, financial hardship, anticipatory grief, withdrawal of support from friends unable to cope with the dying process, and worries about the comfort levels of the patient. Families of terminally ill patients often experience significant fatigue, tension, anxiety, and depression.

Communication is an important factor related to the well-being of both the patient and the family. Studies have shown that while most patients would like to discuss the cancer and their fears, family members often mistakenly believe the patient would prefer they *not* discuss the topic or worry that talking about it will only increase their loved one's distress. Patients often report that after all treatment is completed, they still struggle with the impact of the diagnosis, yet feel that their family is no longer willing to discuss their continuing fears. The open and sensitive expression of desires and feelings can provide significant relief to both the patient and the family.

For a child whose parent is diagnosed with breast cancer, special concerns arise. In general, children of parents with breast cancer are at risk of distress, particularly if the child perceives high stress levels in the family or has poorly developed coping skills. Unfortunately, parents are often unaware of the extent of distress experienced by their children. Young children may not be capable of understanding what is happening, and care is needed in explaining the changes in the family. Although in some situations parents may decide to avoid telling their children about

the cancer, this strategy can lead to more distress in children who sense that something is wrong and may imagine extreme and erroneous explanations. Children who receive increased and supportive interaction with the non-ill parent may cope quite well, especially if the family as a whole copes well with the illness.

Psychological Care and Intervention

In the last several decades, the medical and psychological communities have experienced a growing awareness of the psychological needs of breast cancer patients, and a number of interventions have been developed. A wide variety of resources is available for patients and their loved ones, including self-help books, individual and family therapy, peer-led support groups, internet and telephone support, and group therapy led by trained professionals. Research has consistently shown that psychological interventions can have beneficial effects on emotional adjustment, functional adjustment, and treatment and disease-related symptoms (e.g., nausea, pain).

Many breast cancer patients find comfort through interacting with others who have experienced a similar illness. Peer-led support groups are one of the most widely available forms of support for breast cancer patients. Typically, these groups meet in local communities and are led by the patients and survivors themselves with a free-flow, conversational format.

Professionally led interventions vary widely in treatment setting (e.g., hospital, therapist office, community centers), treatment provider (e.g., psychologist, nurse, social worker), targeted outcomes (e.g., control of nausea and vomiting, pain, emotional distress, quality of life, end-of-life issues), and treatment length (e.g., 1–40 sessions). Supportive group therapy focuses on guiding patients in the process of exploring and expressing their emotions and encouraging social support among group members. Other group interventions focus on improving skills for coping with the cancer and include training in relaxation and guided imagery techniques, educational information, and training in more adaptive coping skills (e.g., problem solving, communicating with health care providers, rational positive thinking about cancer).

Perhaps the most provocative research on the benefits of psychological intervention for breast cancer patients has suggested that psychological distress can affect biological disease processes and outcomes. Although some early research claimed that psychological interventions can improve disease outcomes and increase survival times in women with breast cancer, more recent studies have failed to support these claims. While the psychological benefits are clear and may be reason enough to seek intervention, seeking psychological services in an attempt to improve prognosis or prolong survival is not advised.

Partners and family members of breast cancer patients also need support, but spouse, family, or child-focused supportive interventions are rare. Interested readers may wish to contact local cancer organizations, such as the American Cancer Society, for more information about the availability of these types of support groups. There is also growing recognition of the psychological needs of underserved populations, such as men, women of color, and lesbians. In larger cities, support groups specifically targeted for these populations can occasionally be found, but they are less likely to be available in more rural areas. Services generally follow a peer-led or supportive format. Although there is very little research on the effectiveness of interventions for underserved groups, preliminary studies suggest that psychological interventions can have benefits for mood and psychological well-being in these populations, similar to findings from studies with Caucasian women.

FUTURE DIRECTIONS

Medical advances in the treatment of breast cancer in the last 30 years have been astounding, thanks in part to the millions of dollars that have been devoted to intensive research efforts. Some examples of noteworthy accomplishments include the development of advanced diagnostic techniques using ultrasound and MRIs, the demonstration of the effectiveness of less invasive surgical procedures (e.g., lumpectomy, sentinel node biopsy), the discovery of better chemotherapies to treat systemic disease, antiemetics to manage debilitating side effects of chemotherapy, the use of hormonal therapies to block estrogen receptors, and the identification of genetic markers of susceptibility to breast cancer and genetic tests to predict risk in asymptomatic women. The potential for genetic approaches to cancer treatment in the future has generated quite a bit of excitement. Many women choose to participate in clinical trials of new, as yet unproven treatments. For some, clinical trials are attractive because they may offer a promising new treatment when a good standard treatment is not available.

However, for a number of reasons, women may choose to stay with the standard treatment regimen. For example, clinical trials usually require strict criteria for participation, insurance coverage for clinical trials can be sparse, and participants are generally not able to directly choose the treatment they receive.

Substantial progress has also been made in the understanding and treatment of psychological and behavioral factors associated with breast cancer. These advances have resulted in considerably greater access to psychological services for cancer patients. Often these services are immediately available at the hospital or diagnostic center; however, many treatment centers remain unable to provide psychological services to patients and families. Although most women negotiate the demands of breast cancer well, others struggle in their attempts to cope with the disease. The challenge for the future is to better understand who is in greatest need of psychological health care and to ensure that services are readily available for those in need. Similarly, the future is likely to bring greater opportunities for psychological services directed at those from minority populations. Research is also underway to determine the types and timing (i.e., immediately postdiagnosis or following the demanding treatment regimens) of psychological interventions that are most effective. The availability and sophistication of Internet-based resources, including both peer and professionally developed supportive Web sites, are expected to substantially impact future provision of care for breast cancer. In combination, the increasing recognition of the need to attend to both psychological and medical care promises continuing improvements in the quality of life for those diagnosed with breast cancer.

—Linda J. Luecken and Bradley Appelhans

See also Cancer

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BREATHING REFLEX

The optimal natural breathing reflex is the effortless inhale with the best nervous system balance and least effort that supplies oxygen supply and carbon dioxide balance when needed and helps maintain nervous system balance. It is essentially parasympathetic.

THE REFLEX DURING REST OR INACTIVITY

Optimally it is a "non-pulled-in" inhale that occurs when the body "decides" it needs more oxygen and/or nervous system balance. It can be triggered/induced or completely passive depending on the needs of body oxygen, depths of rest, or release of tensions needed for recovery of energy and nervous system balance.

This reflex causes movement and therefore becomes the key to sensing and feeling one's physical breathing in a state of relaxation or minimal activity as well as high stress. The expansion (tension) and release of that tension, along with the heart, are the force or pump behind many body sensations of circulation such as buzzing, streaming, and breeze-like sensations. We breathe less and feel less alive. It is a key part of the body's relaxation and biofeedback system that dictates as well as informs us whether we are relaxed or not. The larger, deeper, and easier it is to develop, the greater the potential for deeper and easier relaxation, and energy and recovery from activity will be achieved. It is a natural interrelationship of respiratory chemistry and breathing mechanics: a deep peace and a key self-healing potential within the autonomic nervous system.

When functioning properly, the breath reflex occurs spontaneously or can be stimulated or "triggered" for profound full body relaxation and recovery from activity. Blood oxygen restoration with proper CO_2 interrelationships is important, but nervous system balance may be often much more important as this balance allows for strengthened parasympathetic rest, digestion, and healing, and facilitates less need for oxygen and increased dilation of arteries and capillaries for increased blood transport during activity and rest.

A compromised resting breathing reflex can stem from several factors, including any movement more than a few seconds in duration; nonoptimal posture in standing, sitting, or lying; stress, pain, body tensions, or negative emotions manifesting as cellular memories/functional inhibitions within the body; surgery that physically hinders it; poor muscular sequencing

and coordination; nerve dysfunction; nutritional deficiencies, and any form of sleep disturbance.

A compromised resting reflex means that kinesthetic breathing awareness is reduced and we become "less in touch" or "out of touch" with our physical energetic feedback mechanisms, including many physical sensations and "feeling our feelings." Optimal development would be to remove all restrictions to deep, easy, effortless, balanced breathing as well as to remove any aspects of its energetic pathway as it manifests throughout the entire body—to maximize, ease, and flow learning and creativity.

ENERGY-RESTORING REFLEX

During various levels of activity, the reflex attempts to bring the body back into balance. If we move too quickly, not allowing the reflex to "bloom" fully with each breath, we risk installing permanent shallow or unbalanced dysfunctional breathing (UDB). The key is to develop optimal breathing mechanics and chemistry along with lifestyle choices that allow the reflex enough time, depth, and ease to work as effortlessly as possible. Distressing stress is a lot about stifling the reflex and not giving ourselves time enough to breathe.

Other factors that can influence the reflex's ability to balance and restore:

1. Lung tissue or upper respiratory air duct compromise
2. Internal lung pressure that aids or lessens increased saturation of blood, cells, and possibly mitochondria
3. Adequate hemoglobin/iron for oxygen transport, without which the organism is dragged down by its own need for primary energy—it works harder and further increases the oxygen cost of breathing

NERVOUS SYSTEM BALANCING REFLEX

A well-developed natural resting breathing reflex is the doorway to our inner world. Candace Pert states that "your body is your subconscious mind." It is a key governing aspect of ease in developing balance between conscious neocortical rational choice, in the moment responsibility, spontaneous behavior, and rational survival response. The optimal reflex is parasympathetic, which is about neocortical activity/connection—about choosing life-affirming options. You must always come back to the healing place of the deepest, easiest reflex. A small sample is the *huge* breath-catching breath or deep sigh of relief that accompanies a strong feeling of tension release. A deeper breath occurs when tension is released, and if less or no reflex occurs, then less or no tension is released. There is a direct relationship between ease, depth, and balance of the reflex and whether we stay in or go out of peace. Developing a natural optimal breathing reflex is the key—the Rosetta Stone—to the breath that creates the connection of consciousness, subconscious, and optimal rational action.

—Michael Grant White

See also Reflexes

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BREECH BIRTH

Approximately 3% to 4% of all pregnancies reach term (38-plus weeks of gestation) with a fetus in the breech presentation, in which the baby's rear end is introduced before the head. Breech presentation is common when remote from term. However, as term approaches, the uterine cavity most often accommodates the fetus in a longitudinal lie, with head presentation. Predisposing factors for breech presentation are preterm (early) deliveries, excessive amount of amniotic fluid, fibroids, malformations of the fetus or uterus, high parity leading to uterine relaxation, multiple fetuses, abnormal implantation of the placenta on the cervix, and previous breech presentation.

In a complete breech position, the breech comes first with bent knees; in a frank breech, the lower extremities are flexed at the hips and extended at the knees, with feet near the head; the term *footling-breech* applies when the feet enter the birth canal ahead of any other part of the body. Diagnosis of breech presentation can be made by abdominal palpation, when the hard, round head is felt in the upper uterus, and the feeling of small parts or the breech by vaginal examination and confirmed by ultrasound. Breech presentation places a fetus at increased risk for adverse outcome, including morbidity and mortality

from difficult delivery, low birth weight due to preterm delivery (before 36 weeks gestation), prolapse of the umbilical cord, and fetal anomalies.

Discussion and planning for the mode of delivery should ideally take place well before admission to labor and delivery as essential differences exist between labor in head and breech presentations. Undoubtedly, cesarean delivery is preferred when the presentation is footling, the fetus is compromised or large, or has a congenital abnormality that could cause a mechanical problem at vaginal delivery, or when a clinician experienced in vaginal breech delivery is not available. Nevertheless, there is a general consensus that the outcome for the singleton baby is improved by planned caesarean section compared with planned vaginal delivery in any of the breech conditions. In head presentation, the body follows rapidly after the delivery of the fetal head, whereas an infant who arrives breech-first risks having its head stuck in the birth canal because the body does not stretch the birth canal wide enough for the head to pass through. Indeed, spontaneous expulsion of the fetus at breech presentation is seldom accomplished, and assistance of the obstetrician is required. Also, delivery of the breech draws the umbilical cord into the pelvis, which leads to cord compression. This can cause fetal distress, leading to morbidity.

Recently, in a randomized study comparing modes of delivery for breech presentation, neonatal mortality and serious neonatal morbidity were significantly lower for the planned cesarean section group than for the planned vaginal birth group. There were no differences between groups in terms of maternal mortality or serious maternal morbidity.

Most women wish to avoid cesarean section because it is not a risk-free procedure. External cephalic version is the only effective and basically safe intervention to convert a breech fetus to vertex presentation with the potential to help women avoid operations. It is performed exclusively through the abdominal wall by gentle pushing on the abdomen while viewing fetal movement with real-time ultrasound. The buttocks are elevated from the birth canal and grasped laterally, while the fetal head is directed toward the pelvis. Uterine relaxation, induced by certain drugs, is sometimes recommended before the procedure. Fetal heart rate monitoring is performed before and after the external version for assessment of fetal well-being. The risk for urgent cesarean delivery for fetal distress following external version is less than 1%. Studies of external cephalic version at term report a success rate of above 60%. Determinants of unsuccessful version include uterine contractions, diminished amount of amniotic fluid, maternal obesity, and prior descent of the breech into the birth canal.

—Eyal Sheiner

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BRONFENBRENNER, URIE (1917–)

Urie Bronfenbrenner is the Jacob Gould Sherman Professor of Human Development and Family Studies and Psychology at Cornell University and was one of the founders of Head Start. Bronfenbrenner was born in Moscow and came to the United States when he was 6 years old. He received his bachelor's degree from Cornell University in 1938, a master's degree in developmental psychology from Harvard in 1940, and a PhD from the University of Michigan in 1942. Bronfenbrenner served as a military psychologist during World War II and an assistant professor at the University of Michigan from 1946 to 1948. He moved to his present location at Cornell in 1948.

As a child, Bronfenbrenner's father, who was a neuropathologist, often pointed out the interdependence between living organisms and their surroundings. These concrete examples expanded into theories about the ecology of human development, developing substance during cross-cultural field research, which Bronfenbrenner has conducted in Europe, the U.S.S.R., Israel, China, and elsewhere. Bronfenbrenner realized that the developmental process varies by place and time and that public policy affects the development of human beings by determining the conditions of their lives.

Bronfenbrenner is most famous for creating a major theory of human development called *the Ecology of Human Development*. He conceived the human environment as consisting of a set of nested structures consisting of the microsystem, the mesosystem, the exosystem, and the macrosystem.

Bronfenbrenner defined development as a lasting change in the way a person perceives and deals with the environment, and a child is viewed as a growing, dynamic entity that progressively moves into and restructures the milieu in which it resides. The environment also exerts its influence, requiring a process of reciprocity between person and environment.

Later, Bronfenbrenner and Ceci (1994) extended this theory to behavioral genetics. They recommended that explicit measures of the environment in systems terms should be incorporated, as well as proposing the existence of empirically assessable mechanisms, proximal processes through which genetic potentials for effective psychological functioning are actualized. They hypothesized that when proximal processes are weak, genetically based potentials for effective psychological functioning remain relatively unrealized, and as proximal processes increase in magnitude, potentials become actualized to a progressively greater extent.

Bronfenbrenner's contributions have resulted in honors and awards on an international scale. He has been awarded six honorary degrees, invited to contribute to two Presidential Task Forces, and has been honored by the American Psychological Association for "Lifetime Contribution to Developmental Psychology in the Service of Science and Society."

—Livia L. Gilstrap and Elizabeth A. Zierten

See also Ecological Theory

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BROWN, ROGER (1925–1997)

Roger William Brown was the John Lindsley Professor in Memory of William James at Harvard University and recipient of numerous awards, including the Distinguished Scientific Achievement Award of the American Psychological Association and election to the American Academy of Arts and Sciences and the National Academy of Sciences.

Such widespread recognition was prompted by both the substantive range of Brown's scholarship and research and the distinctively felicitous style of his writing. That range encompassed social psychology (including a "Citation Classic" textbook), linguistics, and cognition (notably, his groundbreaking *Words and Things*), but most importantly in this context, the acquisition of language. Here, in a sense rarely as accurate in the history of science, Roger Brown was the founder of the field of language development.

Two facts support such a characterization. One is the lineage of central figures in the study of language development who were all Brown students (from Dan Slobin and others in the 1960s to Steven Pinker and others in the 1970s and 1980s). These researchers have testified to how, collectively and individually, Brown's intellectual and interpersonal gifts gracefully shaped their ways of working.

The other barometer of Brown's influence comes in the shape of conceptual issues and empirical generalizations that emerged from the research he and his students conducted in the 1960s and 1970s. Best exemplified by *A First Language* (another "Citation Classic"), such ideas and findings—and the associated fine-grained analysis of extensive language samples from a few children—formed much of the core framework for the subsequent study of language acquisition. That framework and influence are no less heuristically significant today.

Brown's style of research and writing was a style as elegantly oriented toward story-telling as it was out of step with psychology's "scientistic tendencies"; in his third-person words, "when he graduated from. . . high school in 1943, Brown's ambition was to become a novelist of social protest, like Upton Sinclair." That he later decided "he was not talented enough to be a creative writer" is for continuing generations of students of language development, and many others, to celebrate.

—Frank S. Kessel

See also Mean Length Utterance

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BRUNER, JEROME (1915–)

Perhaps the most eminent living psychologist, Bruner has made an incomparable contribution to our understanding of cognitive development in a career spanning 60 years. His erudite writings, which draw on anthropology, philosophy, and literary theory among other fields, have inspired several generations of developmentalists.

Born in New York City, Bruner was educated at Duke (BA, 1937) and Harvard (MA, 1939; PhD, 1941). After completing doctoral research on propaganda, he served in the United States Intelligence Corps before joining Harvard's faculty in 1945, where he and George Miller established the Centre for Cognitive Studies in 1960. A leading voice in the cognitive revolution, Bruner's early studies established that perception and thinking are organized by mental categories and representations. In the mid-1960s, he forged an influential distinction between enactive, iconic, and symbolic systems of representation.

Bruner's cognitivism has a strikingly pragmatic orientation. He portrays human beings as actively deploying knowledge for practical ends—to organize experience, solve problems, and make sense of reality. In this, he argues, cultural resources that enhance perception and reasoning and enable the externalization and transmission of knowledge massively amplify our cognitive capacities. Bruner's concern with activity and culture drew him to the ideas of Russian psychologists Vygotsky and Luria, whose work he helped introduce to the West. At the same time, his profoundly developmental approach led him to issues of education and its reform. He worked on the President's Science Advisory Committee under Kennedy and Johnson and on the Head Start program.

From 1972 to 1980, Bruner held the Watts Chair in Oxford, where, influenced by Austin's speech act theory, he studied how children learn to do things with words. Challenging the Chomskian orthodoxy, he argued that the maturation of an innate "language acquisition device" (LAD) was insufficient for language development unless complemented by the culture's "language acquisition support system" (LASS). He beautifully illustrated this claim by attentive studies of mother-child interactions. This research established the field of developmental pragmatics.

In the 1980s, Bruner focused increasingly on the role of narrative in the construction of self and reality. In 1990, he produced a compelling critique of the legacy of the cognitive revolution. Contemporary psychology, he argued, has become so enraptured by information-processing and computer models of mind, it has lost sight of how meaning is made by human beings as they construct their understandings of themselves and their world. Bruner called for the development of a "cultural psychology" to remedy this failing.

Bruner's most recent work is on narrative and legal reasoning. He presently holds a professorship at New York University Law School.

—David Bakhurst

See also Cognitive Development

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BUDDHISM

Buddhism is a religious tradition founded by Siddhartha Gautama, who lived in Northern India in the 6th century BC Gautama was called the Buddha after he attained enlightenment; the name Buddha means "The Awakened" or "Enlightened One." Through study, contemplation, and great effort, the Buddha achieved an understanding of the true nature of reality. He then showed his followers that they, too, could reach the same level of knowledge through their own study and practice. Buddhists believe that everyone has a fundamental Buddha-nature and that every human being has the potential to become a Buddha.

Because Buddhism can be regarded as a philosophy, a religion, and a way of life, it does not fit into one category. Everyone has Buddha-nature. Everyone has

the potential to achieve what the Buddha himself accomplished and escape the endless cycle of sufferings, cravings, and transitory pleasures. Moreover, human beings are responsible for their own actions, which can have repercussions after death due to the law of karma. For these reasons, Buddhism is often regarded as a "do it yourself" religion, with a focus on compassion and wisdom.

Practitioners are instructed by a living master called a lama or a guru. They strive to become a Buddha themselves in order to attain enlightenment—a state of wisdom.There is a belief in a future Buddha. The word *belief* is easily subject to misinterpretation with regard to Buddhism, however; Buddhists do not simply accept by faith what the Buddha taught and leave it at that. Instead, they learn by study, contemplation, and practice to experience the teachings and apply them to their daily lives.

In the latter part of the 20th century, Buddhism has spread to many parts of the world and is growing in popularity in the West. It is estimated that there are 200,000 converts in Europe and America.

LIFE OF THE BUDDHA

The life story of the Buddha is not as well known in the West as that of Jesus Christ; yet, the story of the Buddha's journey from great wealth to renunciation to great poverty to ultimate realization is integral to understanding Buddhism and integrating it into one's daily life.

Siddhartha Gautama was born around 563 BC in a place called Lumbini. His father, Shuddhodana, was the king or leader of a group of people known as the Shakyas. Stories of the Buddha's life describe him as a prince who was destined to become ruler of his people and who enjoyed a luxurious upbringing. But after 16 years of a confined and protected life within his palace walls, Siddhartha journeyed into the world. There, for the first time, he became aware of old age, sickness, and death; and he began to realize that these sufferings were part of life. He also met a holy man who showed him that the renunciation of cravings for wealth, material goods, and high status was the way out of these universal sufferings.

Siddhartha decided to retreat to the forest, abandoning the palace life and his family. There he lived as an ascetic for 6 long years, but he eventually realized that simply starving himself was counterproductive. So he decided to abandon all extremes and practice a moderate, middle way instead. Finally, while in deep meditation under the Bodhi tree at a place called Bodh Gaya (now located in the Indian state of Bihar), he achieved the ultimate realization of the true nature of life and all creatures within it; he thus became the Buddha, the Enlightened One. After spending 7 weeks meditating on what he had realized, he decided to communicate what he had achieved to anyone who would listen. He was then about 35 years old, and he spent the next nearly 50 years teaching what he had learned. The series of teachings, which is called the Tipitaka, is broken into three types:

1. *Sutras*, or conventional teachings and stories
2. The *Vinaya*, or instructions on morality for monks
3. The *Abhidharma*, teachings on moral psychology and philosophy (these are generally attributed to the Buddha, though some scholars believe they grew out of commentaries written by followers of the Buddha)

The accumulated teachings of the Buddha and the spiritual development they bring to the practitioner are frequently referred to as the Dharma. The historical Buddha who originally achieved these realizations is known as Buddha Shakyamuni; he is thus distinguished from others who have attained a state of enlightenment and become Buddhas themselves, as well as from Buddhas who are expected to come in the future.

The Buddha died when he was about 80 years old at a place called Kusinara, leaving behind dedicated and accomplished followers called the Sangha. They and generations of sanghas have carried on his teachings and transmitted them to generations of practitioners throughout the world. Today, Buddhism is one of the world's great religions, followed by millions in countries including China, Tibet, Sri Lanka, Myammar, Nepal, Korea, Japan, Thailand, Vietnam, Cambodia, and Laos. The invasion of Tibet by the Chinese in 1959 and subsequent dispersal of Buddhist teachers has brought Buddhism to the United States and to Europe, as well as to other countries.

BASIC TENETS

Buddhism does not originate in heaven and is not handed down to earth by divine beings, but instead it is derived from the enlightened teachings of a man who lived on earth and achieved great wisdom. Buddhists follow the Buddha's example in not relying

on divine guidance, faith, or traditional beliefs. Rather, they use experience, reasoning, and meditation to achieve the goals of nirvana and freedom from suffering for all other beings. Tolerance for other religions and cultures and aversion to violence and bloodshed have always been central to Buddhism as well.

Many of the tenets described in the sections that follow have been handed down over 2,500 years by oral tradition. Many Buddhist sects emphasize the importance of obtaining teachings from a qualified master who has received teachings from masters before him. The Theravadan sect emphasizes the importance of studying and interpreting the Buddha's original oral teachings. The Mahayana and Vajrayana schools emphasize a more liberal path in which students must learn from a master but can achieve their own realizations and understanding.

The Four Noble Truths

Rather than immediately seeking to tackle fundamental questions such as "What is the meaning of life" and "What happens after death?", Buddhism seeks to explore the state of human existence. The root teaching is that of The Four Noble Truths. The Four Noble Truths are phrased in many different ways, but each describes the nature of existence: Life is transitory and beings are subject to suffering, but a cessation to suffering is found by renouncing worldly concerns and pursuing wisdom. They can be summarized as:

1. The truth of suffering (in Pali, *dukkha*; in Sanskrit, *duhkha*)
2. The truth of the cause of suffering
3. The truth that there is an end to suffering
4. The truth of the path leading to the cessation of suffering

The term *dukkha* has many connotations besides the experience of mental or physical pain. Accordingly, the Buddhist concept of suffering comes in many forms. In addition to pervasive physical suffering, humans confront mental suffering and the suffering of change—birth, death, disease, the satisfaction of desire, the deprivation of not having what is desired. Even in moments of happiness and satisfaction, there is suffering because of the inevitable loss of that state when conditions change and time passes.

Buddhism's emphasis on the suffering that is an integral part of human life leads some to conclude that it is a negative or "unhappy" religion. But only through clearly perceiving the nature of existence can one obtain true happiness as well as gain the impetus to change one's own life and achieve healthier states of mind.

Refuge

In order to become a Buddhist, monks and lay people alike go through a refuge ceremony. In this ceremony, they acknowledge their fear of suffering and death and place reliance on the three jewels of Buddhism: the Buddha; his teachings, called the *dharma*; and the spiritual community, the sangha. The refuge prayer is quite simple: "I go for refuge to the Buddha; I go for refuge to the dharma; I go for refuge to the sangha."

Those who become Buddhist monks must observe a strict set of vows. Lay people can also take vows when they decide to commit themselves to the aims of a *Bodhisattva* (a being who seeks to attain a state of enlightenment out of great compassion for all suffering beings) or when they enter the Vajrayana branch of the Mahayana path (see "Vajrayana," below).

Karma

The process of life and the events associated with a life may seem to arise from chance, but they result from cause and effect. The system of cause and effect is known as *karma*. Karma holds that individuals can exert some measure of control over their lives by the decisions they make and the conditions in which they place themselves. One who takes risks by driving very fast in crowded traffic on a repeated basis creates the karma for having a car accident, for instance; one who drives slowly and infrequently does not have the same karma. At its essence, the law of karma can be distilled in the phrase *all actions meet with consequences.*

Karma causes sentient beings to exist in different forms from one life to the next; a being can be a human born to royalty in one life, an elephant in another, a cat in another, or a human born to a poor family in another. Karma can cause people to make themselves unhappy or to achieve great happiness; the difference lies in one's motivation. Actions that are motivated by self-interest, greed, or jealousy will cause suffering. Actions that arise from love for others or a desire to help others will bring about happiness.

The Buddhist practitioner seeks to maximize the amount of positive karma he or she generates and minimize negative karma as much as possible. This is

done by avoiding states of mind such as pride, attachment, selfishness, and anger and by cultivating love and compassion. Karma, like everything, is impermanent; actions do leave imprints on the consciousness, but these imprints can be removed or purified by meditation, prayer, and antidote actions. At the time of death, the karma accumulated through one's life plays a role in one's future lives; the belief that karma affects one's existence applies not only to the current lifetime but to lives that have passed and to lives that are to come.

Dependent Origination

One of the most profound concepts of Buddhist philosophy holds that whatever exists depends on causes and conditions. Nothing exists independently of the way it is perceived, the causes that created it, and the conditions that surround it. Concepts such as "I," "you," "mine," and "yours" are all based on the misperception that there is a solid and definable self that arises independently from causes and conditions. When the causes and conditions are removed, the object no longer exists.

The Buddha taught that the doctrine of dependent origination manifests itself in a series of 12 links that make up a human life. These 12 links of dependent origination are

1. An initial state of ignorance, which leads to
2. Volitional actions, which lead to
3. Consciousness, which leads to
4. Names and forms, which lead to
5. The six bases—the five senses and the mind—which lead to
6. Contact through sense impressions, which leads to
7. Feelings, which lead to
8. Desires or cravings, which lead to
9. Attachment, which leads to
10. Becoming—the process of karma and rebirth, which leads to
11. Rebirth, which leads to
12. Old age and death

These 12 steps are traditionally depicted around the outer edge of a Buddhist image called the Wheel of Life, which shows human existence as a great wheel being held in the fangs of Yama, the Lord of Death. Inside the 12 steps are the six realms of existence: human, animal, hell, ghost, demi-god, and god. At the center are the three root delusions (also called the three poisons): attachment, in the form of a cock; anger, in the form of a snake; and ignorance, in the form of a pig. The continual cycling through these 12 stages and from one life to another is called *samsara*.

Samsara

Samsara is a Pali and Sanskrit word that means a perpetual state of wandering and motion. Buddhists use the word to describe cycles of existence that are without end—moving from one life to another and continually suffering without progressing toward liberation from that suffering. One of the Buddha's fundamental teachings is that beings who are trapped by ignorance cycle through all realms of existence—the fires and ices of the many Buddhist hell realms, the perpetual desire of the ghost realm, the animal realm, the human realm, and the god realms where beings are too lazy to seek spiritual growth. The term *ignorance* is seen as the opposite of wisdom; it refers to a state of mind that sees the ego as of preeminent importance and self-interest as desirable. Ignorance keeps beings in a perpetual state of desire, dissatisfaction, and suffering—trapped in samsara, in other words.

One of Buddhism's three principles is the liberation from samsara through the attainment of wisdom. Wisdom is the realization that the cycle of desire and self-interest brings about suffering, that the "I" is not solid but dependent on causes and conditions, and that all beings seek the same happiness and are interconnected in a state of mutual dependence. Buddhists strive to evade the confusion of the ignorant mind that is bound in samsara and achieve a precious rebirth as a human being. Only a human being has the ability to learn and grow and achieve freedom from suffering and samsara.

Nirvana

Nirvana is freedom from *samsara*. It is said to be a state of bliss arising from the perception of wisdom—the realization of true reality. Nirvana is attained when the practitioner realizes the ultimate truth that all beings depend on conditions and that existence is marked by impermanence, dissatisfaction or suffering, and the nonexistence of an independent self. The practitioner who attains a state of nirvana is known as an *arhat*.

Of course, the term *nirvana* is itself a label or concept that is created by minds that are fundamentally deluded. The Sanskrit term suggests a state of coolness and peacefulness. This state of mind is not touched by suffering or vicissitudes of desire, aversion, attraction, and ignorance. It is said to be indescribable and unknowable by a mind that clings to concepts.

Nirvana is not a state of nothingness. It is called *emptiness,* but it is not completely empty; it is marked by love and compassion and empty of clinging and the habit of establishing identity, boundary, and separation. It is difficult to put a label on a state of mind that sees labels as relative and dependent. Nirvana is not a place or emotion, but a state of mind marked by clarity of perception and freedom from delusions such as anger, ignorance, and attachment. It is an experience that transcends awareness and simple labels.

Rebirth

Just as existence involves the combination of mind and matter, death involves the separation of mind and matter. Rebirth is the recreation of mind and matter in a new form after death. The exact form of rebirth is determined by one's accumulated karma at the time of death. A sufficient quantity of positive karma will result in a positive rebirth in the human realm of existence rather than the animal realm or one of the many hell realms.

Heaven and Hell

Buddhist visions of heaven and hell differ greatly from those of other religions. The Buddha taught that nothing is permanent, including the pleasures of heaven or the sufferings of hell. Accordingly, heaven and hell are not fixed, eternal places where one spends an endless amount of time. Those who are condemned to hell can eventually free themselves and be reborn, depending on the karma that propelled them to hell in the first place. Similarly, places called the Pure Lands, which are pleasure groves that are roughly analogous to heaven, are the destinations of practitioners who have achieved great progress and accumulated positive merit and karma.

Where one's consciousness goes after it is freed from the body at the moment of death is determined by karma and by one's state of mind at the moment of death. Much of Buddhist teaching (particularly the Mahayana and Vajrayana schools) can be seen as preparation for the moment of death. One's state of mind at that moment, which depends on a lifetime of karma and many years of spiritual practice, can potentially lead one to a state of enlightenment. It can also propel one into a hell realm or a Pure Land. Buddhists believe in many different hell realms. Some are marked by fire, some by ice, and some by endless unquenched thirst and hunger. One can also be reborn as an animal or as a Samsaric God—one who lives in luxury and pleasure that overwhelms any desire for spiritual growth or achievement of nirvana. Samsaric Gods, like others in samsara, eventually leave their present realm and are reborn into another realm marked by a different kind of suffering. The cycle is only broken when one achieves nirvana or liberation from suffering.

THE TWO VEHICLES

Buddhism is divided into two main schools: Theravada and Mahayana. The Mahayana is further divided into the Mahayana and Vajrayana. These three paths all have the goal of leading practitioners to a state of enlightenment. The dharma is the same for each path, and there is no basic contradiction between the teachings followed by the different schools; the difference is in which principles are emphasized and the methods by which they are put into practice.

Theravada

Theravadan Buddhists believe that enlightenment can be attained through their individual effort. They rely on the original teachings of the Buddha rather than on subsequent texts developed by later followers. The goal is to seek liberation, or a state of nirvana, from the cares and vicissitudes of this life. The Therevadan Buddhists seek to attain a perfect state of well-being and happiness so that the world will be a better place. Buddhists in Sri Lanka, Myanmar, and Thailand belong to this school.

Mahayana

Mahayana Buddhists study the original teachings of the Buddha, but these are seen only as foundations for the Buddhist system that others can explore and elaborate on more fully. Buddhist scholar Mu Soeng (2000), in his book *The Diamond Sutra,* describes it as "Visionary Buddhism." Practitioners seek salvation not only for themselves but for all other beings. In fact, they delay their own attainment of Buddhahood until they help others achieve liberation. They believe that, by following the teachings expressed in the

sutras, they can become Buddhas after lifetimes' worth of effort. They call on the help of enlightened beings known as Bodhisattvas to help them achieve this goal; after death, they may seek to attain rebirth as Bodhisattvas in order to help others. Buddhists in Tibet, China, Japan, and Korea belong to this school.

Vajrayana

Vajrayana Buddhism is part of the Mahayana path. Vajrayana Buddhists follow complex and secret practices obtained through initiations. The goal is to attain Buddhahood as quickly as possible—ideally, within a single lifetime. The quicker one becomes a Buddha, the quicker one is able to help others achieve the same goal.

MAIN PRACTICES

Although Buddhism developed from the Buddha's intellectual practices, it is not purely a rational process. The attainment of wisdom is also achieved through meditation and practices such as mantras (sayings associated with specific deities or practices) and mudras (hand gestures, often performed with implements such as bells that generate sound). Together, the practices involve the practitioner's body, speech, and mind.

Bodhisattva Activities

All Buddhist schools agree on the central principle of "Do no harm." When asked by a student "What do I do?", the Buddha reportedly responded with the simple answer: "Do no harm, act for the good, purify the mind. This is the teaching of all the Buddhas." Accordingly, Buddhists seek to avoid 10 nonvirtuous actions (3 having to do with the body, 4 with speech, and 3 with the mind).

The three of the body are

1. Killing or physically harming others (for many, this leads to a vegetarian lifestyle that does not include beings that have been killed)
2. Stealing
3. Sexual misconduct

The four of speech are

1. Lying
2. Using harsh or angry language
3. Gossip
4. Frivolous talk

The three of the mind are

1. Covetousness or greed
2. Anger
3. Wrong view (a misperception about suffering or a belief that there is no karmic result from an action)

Some Mahayana sects take the "Do no harm" principle many steps further and seek to perform "Do good" actions. Their goal is to express love and care for other beings that resembles the love of a mother and child. They accumulate merit—good actions that, repeated over time, bring happiness and good fortune. They also practice six skillful activities, also known as the six perfections:

1. Generosity: the giving of time, energy, resources, or love to those around us
2. Morality: the keeping of one's vows and commitments
3. Patience: the ability to bear abuse and misfortune
4. Enthusiasm: the enjoyment of positive efforts, particularly spiritual development
5. Concentration: the skill needed to study, meditate, achieve realizations, and progress toward enlightenment
6. Wisdom: the realization of the nature of existence

The Bodhisattva seeks to practice these virtuous efforts not only for his or her benefit but for the benefit of all beings. A Bodhisattva, after death, seeks to postpone his or her enlightenment and return to earth in human form in order to help all others achieve enlightenment—a state of mind known as *bodhicitta*. Such is a great love and compassion that motivates this awakened being.

Studying the Dharma

Buddhism is an inward religion. Followers are those who look inside themselves and study their mind and their behavior, seeking to change habitually negative patterns and cultivate positive ones. They do this by studying the Buddha's teachings, meditating on them, and making them part of their daily lives and activities.

The teachings of the Buddha are called the Lion's Roar for its power and majesty. The Buddha is said to be the doctor, the dharma is the medicine, and the sangha is the nurse. By learning the teachings, the Buddhist practitioner seeks to integrate them into his or her daily activities as a parent, a worker, a friend, a neighbor, or a citizen. Some of the most important principles taught by the Dharma and studied by Buddhists include

- Freedom from attachment. Human beings continually desire objects, experiences, and other human beings, as well as states of mind. Buddhists seek to achieve nonattachment. They may want experiences or objects, but their motivation is not self-interest; rather, it is generated by love and concern for others.
- An understanding of consciousness. The consciousness that enables beings to perceive objects and events and attach labels and interpretations to them is flawed by deluded mental factors called *aggregates* or *skandhas*. Understanding these mental factors enables the mind to begin to have experiences and thoughts that are not clouded by ignorance.
- Overcoming anger and aversion. Anger is one of the three root delusions (anger, attachment, and ignorance), an emotion that can harm others and harm the individual who experiences it by destroying positive actions that may have preceded the angry one.
- The selfless nature of phenomena. Buddhism emphasizes selflessness—freedom from grasping and continually focusing on the self, and realizing the transitory, impermanent nature of events and suffering.

The Noble Eightfold Path

The fourth of The Four Noble Truths taught by the Buddha is that there is a path that leads one away from suffering and toward wisdom. This path toward liberation has been laid out in a series of steps that Buddhists can follow and that leads toward a state of nirvana: The Noble Eightfold Path. The eight steps are

1. Right understanding
2. Right thought
3. Right speech
4. Right action
5. Right livelihood
6. Right effort
7. Right mindfulness
8. Right concentration

These steps are considered part of the Three Higher Trainings, which are also three of the six perfections (see "Bodhisattva Activities"): morality, concentration, and wisdom. Because these three higher trainings need to be developed together, the eight steps above do not necessarily have to be followed in exact sequence. All of these practices depend on correct motivation: the goal of achieving happiness, transcending suffering, thinking of other beings rather than ourselves, and wanting all other beings to be happy as well.

Meditation

Meditation is central to all Buddhist schools and practices. Through meditation, the practitioner is able to quiet the "noise" produced by emotions and events. A quiet, calm mind brings benefits in and of itself, but it is also able to learn spiritual principles and remember them more clearly. Buddhist meditation takes two forms:

- *Shamata*, or "calm abiding" meditation
- *Vipassana,* or insight meditation

Meditation begins by examining and correcting one's motivation. One motivation might be to progress and achieve realizations—first, to better help one's immediate circle of friends and family, and then ultimately to help all beings.

The correct posture is also important to achieve insight. It involves sitting cross legged, with one leg placed atop the other. A chair or pillow may be used for greater comfort and to straighten the spine; discomfort can interfere with one's thoughts and be counterproductive. The eyelids are lowered but not closed. The tongue is placed behind the upper teeth, and the mouth is slightly closed. The hands are placed atop one another in the lap.

In *shamata* meditation, concentration is placed on an object or thought. It may be one's own breath—the movement of the breath across the space between the lips and the nose and through the nostrils. It may also involve counting or visualization of colors. When the attention wanders, as it inevitably will, the practitioner gently brings it back to the object of meditation. This will be repeated many times, until gradually one is able to concentrate for greater periods on the desired object.

In *vipassana* meditation, the practitioner initially opens the mind's attention to an awareness of all that is happening in the surrounding environment. Then, the mediator concentrates on a particular teaching of the Buddha or a point of information that has been

conveyed by a teacher or *guru*. The goal is to understand the point fully, to reason through the concept, and to be able to remember it and use it in one's daily life. Ultimately, the practitioner's mind is able to understand that, as the Buddha taught, "everything that arises passes away and is not self."

Sangha

Like many aspects of Buddhism, the sangha has both a historical context and a real-world application. In a historical sense, the original sangha is the followers of the Buddha himself, who established an oral tradition based on his teachings. In a real-world sense, one's sangha is the group of spiritual practitioners who help one another along the path to enlightenment. Although Buddhism places great emphasis on self-reliance, only the Buddha Shakyamuni himself was able to achieve enlightenment alone. For those in the world today, a group of spiritual friends is essential for creating a space in which to meditate and learn, and for providing the means of supporting a teacher or *guru* who can explain the dharma and guide students along the spiritual path.

—Greg Holden

See also Religion

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BULIMIA NERVOSA

Bulimia nervosa is an eating disorder characterized by recurrent episodes of binge eating (see Binge Eating, this volume) accompanied by inappropriate compensatory strategies that are used to prevent weight gain. These inappropriate compensatory strategies include self-induced vomiting, fasting, excessive exercise, and the misuse of laxatives, diuretics, enemas, or other medications. Self-induced vomiting is the method used most frequently by individuals seeking treatment for bulimia nervosa. However, it is not unusual for individuals with bulimia nervosa to use multiple strategies to compensate for binge eating. To receive a diagnosis of bulimia nervosa, the binge eating and inappropriate compensatory weight control strategies must occur frequently, averaging at least twice a week for the previous 3 months. There are two subtypes of bulimia nervosa: the *purging type*, characterized by the regular use of self-induced vomiting or regular misuse of laxatives, diuretics, or enemas to prevent weight gain; and the *nonpurging type*, characterized by the regular use of fasting or excessive exercise, but not purging.

In bulimia nervosa, binge eating and the use of inappropriate compensatory behaviors are accompanied by an additional symptom: an overemphasis on weight and shape in one's self-evaluation. The body dissatisfaction experienced by individuals with bulimia nervosa often leads to chronic restriction in the amounts and types of food consumed. When food intake is severely restricted, binge eating is more likely to occur.

Following the binge, an individual with bulimia nervosa may purge to relieve the physical discomfort associated with the binge and reduce the fear of weight gain. Between binge-purge episodes, individuals with bulimia nervosa typically restrict their caloric consumption, limiting their food choices to low-calorie, "diet" foods and avoiding foods perceived as "fattening."

According to the current *Diagnostic and Statistical Manual of Mental Disorders*, bulimia nervosa is fairly prevalent, affecting between 1% and 3% of women. Men are much less likely to develop bulimia nervosa, comprising only 5% to 10% of all cases. Bulimia nervosa typically begins in adolescence or early adulthood. During adolescence, girls experience significant changes in their body shape and weight. Young women's internalization of the extremely thin contemporary beauty ideal promoted in Western society is one factor that may contribute to the much higher prevalence of bulimia nervosa among women.

Bulimia nervosa is associated with depressive symptoms and mood disorders. However, it is not clear whether the depressive symptoms precede or follow the development of bulimia nervosa. There

also are medical complications associated with various forms of purging. Self-induced vomiting and laxative or diuretic abuse may be associated with hypokalemia, a serious electrolyte disturbance. Self-induced vomiting also may be associated with swelling of the parotid glands, esophageal problems, and erosion of dental enamel, while laxative abuse may result in the loss of normal peristaltic function.

There are several different treatments for bulimia nervosa. The most widely investigated form of psychotherapy for bulimia nervosa is cognitive behavior therapy. This treatment focuses on educating individuals about the disorder, normalizing their eating patterns, addressing dieting and the overemphasis on weight and shape in self-evaluation, and preventing relapse. Research has found that cognitive behavior therapy for bulimia nervosa produces substantial reductions in binging and purging, gains that are usually maintained over follow-up periods of 6 to 12 months. Many regard cognitive-behavioral therapy as the treatment of choice. Although less widely investigated, interpersonal psychotherapy, a short-term psychological treatment that focuses on identifying and resolving interpersonal problems, also has been used in the treatment of bulimia nervosa. The rationale for this treatment is that interpersonal stressors may precipitate binge episodes. Finally, since bulimia nervosa frequently is associated with depression, antidepressant medications may be used with therapy in the treatment of this disorder.

—Janis H. Crowther and Michele Pole

See also Eating Disorders

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National Eating Disorders Association, http://www.nationaleatingdisorders.org

BULLYING

Bullying, also referred to as peer harassment or victimization, is defined within the context of peer relationships in childhood and adolescence and involves the frequent, persistent, and intentional use of physical harm or intimidation by one child or a group of children to victimize another child. Most definitions of bullying also emphasize a power differential between the two parties involved, such that targets of the aggression (i.e., victims) lack the physical, psychological, or social resources to defend themselves successfully. Bullies may engage in two types of aggression—*overt* and *relational* aggression. Overt aggression constitutes more direct physical and verbal acts, including starting fights, pushing, name calling, and taunting. Relational aggression targets children's social networks in seeking to ostracize victims from the peer group by starting rumors about them or excluding them from group activities. Although there have been incidents in which these types of social interactions have escalated to more serious outcomes (e.g., homicide, suicide), bullying is not traditionally thought to include these more extreme forms of violence.

PREVALENCE OF BULLYING

Because schools provide a natural structure within which children's peer relationships develop, studies examining the prevalence of bullying have typically been conducted in American and European schools and have identified bullying as a common experience affecting many children and adolescents. In a recent national study of 15,686 sixth through tenth graders in the United States, 29.9% of the total sample revealed that they were involved in bully-victim behaviors at least several times within the current school term. Of these students, 13% were involved as bullies, 10.6% were targets of bullies, and 6.3% reported involvement as both bullies and victims. Additionally, boys were more likely than girls to bully or be victimized, as were students in the sixth through eighth grades. A similar nationwide survey conducted among 130,000 primary and junior high school students in Norway found that 15% of the children indicated involvement in bully-victim problems "now and then" or more frequently. Of this sample, 7% bullied other children, 9% were victims, and 1.6% were both bullies and victims. These national studies of bullying prevalence signify the increasingly accepted trend that bullying seems to increase during the elementary school years and peak during junior high or middle school, with relatively fewer reports of such behaviors during the high school years.

GENDER CONSIDERATIONS

The common perception and frequent finding that boys seem to be more involved in bullying, as either a

bully or a victim, have led to increased attention in recent years to the notion of gender differences in bullying behaviors. In turn, several studies have suggested some differences in the types of aggression exerted by boys and girls. Overall, boys are more likely to be identified as bullies, engage in overt aggression, and fall prey to overt victimization, while some studies suggest that girls might be more likely to engage in and suffer from relational forms of aggression. Further, aggressive boys tend to victimize both boys and girls, while girls are more likely to target other girls.

CHARACTERISTICS AND ADJUSTMENT OF BULLIES

Bullies and their victims have typically been distinguished from one another to contrast the social, psychological, and academic adjustment correlates associated with these roles in the elementary school peer group. There is some disagreement among developmental researchers as to the function or purpose of the aggression displayed by bullies, as evidenced by the concepts of proactive and reactive aggression. Proactive aggressors are thought to utilize aggression as an instrumental social strategy that is organized and goal-directed (e.g., bullying other children to gain dominant peer status or possession of some material good). Thus, bullies generally view the use of aggression as an acceptable and effective tactic. Reactive aggressors, on the other hand, tend to attribute hostility in any provocation from their peers and, consequently, choose to use aggression in response to perceived threat.

Regardless of the motivation for using aggressive behavior, bullies likely choose aggression as a means of interpersonal negotiation because of exposure to such behavior at home or school, such as coercive or punitive parental discipline. Impulsivity, emotional reactivity, attention deficits, disruptiveness, and other externalizing behaviors commonly characterize bullying children, and these types of traits likely foster the increasing peer rejection that bullies have been found to experience as elementary school progresses. Additionally, these children tend to struggle in their academic pursuits, whether from a coexistent lack of preparation for school or as a result of the distraction from academics that bullying provides in the classroom. Early negative experiences in the school environment seem to put bullies at increased risk for school absenteeism and dropout in middle school and high school. In addition to children's exposure to aggressive interpersonal strategies in their environments, adults' and peers' tolerance of or lack of attention to bullying problems can further reinforce such childhood peer interactions. Bullying during the school years subsequently places children at high risk for antisocial, aggressive behaviors later in adolescence and adulthood (e.g., delinquency and criminal offenses).

CHARACTERISTICS AND ADJUSTMENT OF VICTIMS

Similar to bullies, the targets of aggression (i.e., victims) have also been subdivided based upon their responses to bullying. Developmental theorists have distinguished between passive victims and provocative victims. Passive victims are defined as anxious and insecure children who tend to avoid conflict and refrain from defending themselves when bullied. They are often physically weaker than their peers, withdrawn, lacking in assertiveness, and respond with passive submission to the requests of others. Provocative victims, on the other hand, frequently try to defend themselves and may provoke bullies to victimize them by losing their tempers and irritating and teasing other children, including the bully. They are frequently characterized as impulsive, overly reactive, and lacking an ability to regulate their emotions. Because provocative victims are often unsuccessful in their use of aggression and attempts to defend themselves, they often become distressed and frustrated in their peer interactions.

When peer harassment becomes a chronic experience, both passive and provocative victims face increasing rejection from their peers. Because the targets of bullying often lack the support of other peers and spend much of their time alone, the emotional impact of their peer group status and experiences is likely internalized. Furthermore, many studies have documented the concurrent link between victimization and internalizing difficulties, specifically anxiety, depression, loneliness, and low self-esteem. Overall, depression and loneliness have a stronger relationship with victim status than anxiety and low self-esteem. A large number of studies have examined the relationship between victimization and psychological maladjustment at the same point in time, but dramatically less is known about how this link persists over time. Little is also known about whether these psychological difficulties precede or follow peer harassment experiences, though some preliminary evidence suggests that anxious/withdrawn children appear to be

easy targets for bullying. Moreover, being bullied serves to further exacerbate this anxiety and additionally leads to low self-esteem and depression. In addition to psychological difficulties, victims of bullying, like the bullies themselves, demonstrate problems in school. Their experiences of victimization at school seem to lead to avoidance behavior evidenced by school absenteeism, likely induced by fear and not feeling safe in the school environment. Victims also tend to perform poorly on academic tasks.

ASSESSMENT AND SCHOOL INTERVENTIONS

To identify children who are either bullies or victims of bullies, psychologists utilize a variety of assessment methods, including self-report questionnaires, peer nominations, and teacher nominations. Though more practical when studying smaller groups of children (e.g., children's play groups), direct observations and child interviews are also helpful as a means of understanding the dynamics of bullying. Numerous studies have addressed the strengths and weaknesses of relying on information provided by each of these methods of assessment, conclusively suggesting that a comprehensive evaluation using a variety of informants is the most valuable. Because poor psychological outcome among victims of bullying seems to be so closely linked to these children's internalization of their experiences, self-report questionnaires tapping internalizing difficulties (e.g., depression) can be helpful to identify the extent to which victims are suffering.

Prevention and intervention programs addressing bully-victim problems have most often been implemented in schools. Some of the techniques incorporated in Scandinavian schools, for example, include discussing bullying problems with all students and parents in a school, increasing monitoring during recess and lunch, developing class rules that address bullying, and having individual conferences with those children and their parents who are identified as bullies or victims. Additionally, programs in the United States have taken a schoolwide approach to educating all students about bully-victim dynamics and raising awareness about the positive and negative impact of student bystanders (i.e., those students who either support bullies or stand up for victims). Further, physical education programs have been used for encouraging the development of self-esteem and assertiveness as a defense against bullies, and mentorship programs provide a context for discussing effective conflict resolution. Evaluations of these programs have suggested decreases in victimization and improved overall school climate, though the magnitude and duration of these results vary among outcome studies. The effectiveness of antibullying/antivictimization interventions remains to be fully determined.

—Jennifer A. Mize and Michael C. Roberts

See also Aggression

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C

Child Rearing

I have found the best way to give advice to your children is to find out what they want and then advise them to do it.

—Harry S. Truman

CANCER

Cancer is a term used to describe more than 100 different diseases that can affect almost any part of the body. In healthy people, cells replicate and create exact copies of themselves to replace dead or damaged cells. Cancer occurs when the deoxyribonucleic acid (DNA) makes an error when copying itself, resulting in a cell that cannot perform its proper function. This bad cell replicates quickly and can form a tumor or can be found in the bloodstream (e.g., leukemia). Thus, cancer develops from our own bodies, but represents a mistake in a normal body process.

SYMPTOMS

Each type of cancer presents with a distinct set of symptoms, although in many instances the symptoms do not appear until the cancer is advanced. These symptoms tend to be specific to the location of the cancer. However, there are some general symptoms that occur in many forms of cancer. For example, unexplained weight loss, fever, fatigue, pain, and skin changes (e.g., pigmentation) are often associated with cancer. Other common symptoms include changes in bowel or bladder functioning, unusual bleeding or discharge, a lump in the breast or other part of the body, chronic indigestion, or a persistent cough or hoarseness. Since early detection is important for successful treatment, it is essential to consult with a physician if you are experiencing any number of these symptoms.

STATISTICS

According to 2003 statistics, cancer causes 23% of deaths among adults, second only to heart disease. In deaths resulting from illness, it is the leading cause of death among children. More than 1.3 million people are expected to be diagnosed with cancer in the year 2004. Far more adults than children experience cancer, as nearly one half of men and one third of women will be diagnosed with cancer sometime in their lives. The most common forms of cancer in adults occur in the prostate, breast, lung, and colon/rectum. Cancer is still rare among children, occurring in about 1.5 of every 10,000 children. Leukemia accounts for approximately 30% of childhood cancer cases.

TREATMENT

To obtain higher rates of recovery, aggressive treatment including a combination of surgery, chemotherapy, and radiation therapy is frequently needed. Depending on the type of cancer and degree to which the cancer has spread, different treatments are used.

Surgery

If the cancer is detected early, surgery can be used to remove the cancerous cells and may be the only treatment necessary. Surgery is also used to diagnose cancer by removing a small portion of the tumor (a biopsy) to determine whether the tumor is cancerous. A tumor that is cancerous is termed "malignant," while a noncancerous tumor is designated as "benign." Surgery can also provide information to determine how far the cancer has spread, through a process called staging. Almost all cancer patients undergo surgery at some time during their cancer treatment. Although complications can occur during and after surgery, the advantages of removing the cancerous cells usually far outweigh the side effects. Some patients may experience excessive bleeding during the procedure, damage to surrounding organs, or reactions to anesthesia during surgery. Following surgery, most people experience varying degrees of pain. Other side effects can include infections, bleeding, pneumonia, and blood clots. In cases of brain tumors, cognitive or behavioral changes may occur as a result of the cancer or of the surgery.

Radiation Therapy

High doses of radiation can kill cancer cells or keep them from multiplying. Radiation therapy is a component in the treatment of approximately half of cancer patients. There are two different types of radiation therapy: external radiation (most common) and internal radiation (also called brachytherapy). The side effects differ by type of treatment, site of the radiation, and a number of patient variables. However, the most common acute side effects include fatigue and skin irritation or changes at the radiation site. Very young children who receive cranial irradiation therapy for leukemia or brain tumors may be at greater risk for cognitive or behavioral changes.

Chemotherapy

For patients with leukemia and those with cancer that has affected multiple parts of the body, chemotherapy may be necessary. Chemotherapy medications are designed to kill rapidly reproducing cells, such as cancer cells. Multiple chemotherapy medications are given together to create the best treatment for the cancer. Chemotherapy is administered in cycles, rotating between therapy and recovery periods. The length of treatment and number of chemotherapy cycles depends on the type, severity, and location of the cancer. The average length of treatment is 6 months. Side effects result primarily from the fact that the chemotherapy medications kill rapidly reproducing healthy cells such as those in the bone marrow, digestive tract, reproductive system, and hair follicles as well. The damage to the reproducing cells in these areas can result in low white blood cell counts (increased risk for infection), low red blood cell counts (anemia), low platelet counts (difficulty with blood clotting correctly), appetite loss, taste changes, nausea, vomiting, constipation, diarrhea, fatigue, hair loss, and pain. Most side effects start to decrease after chemotherapy has ended and the cells that were damaged have been replaced.

Supportive Treatment

In some cases, when more aggressive treatments have proven to be ineffective in curing cancer, patients can choose to have only those procedures that will reduce pain and make them more comfortable (called supportive or palliative care). In instances where the cancer has spread to many parts of the body and has not responded to treatment or when it continues to recur, death may be imminent. Palliative care and hospice teams can provide support for the patient and families during the end of life.

SURVIVAL RATES

Recent advances in the treatment of cancer have resulted in increased survival rates, especially among children. The current 5-year survival rate for pediatric cancer is 78%, ranging from 45% for acute myeloid leukemia to 94% among Hodgkin's lymphoma patients. Among adults, the average 5-year survival rate is 62%, with rates ranging from 15% for lung cancer to 97% for prostate cancer. The current 5-year survival rate for women with breast cancer is 87%. These rates are average survival rates and do not take into account age, physical health, or degree of cancer spread. Younger, healthy adults whose cancer is detected early on have the higher rates of survival.

PREVENTION

Although it is unlikely that most forms of childhood cancer can be prevented, experts estimate that 50% to 75% of adult cancer cases result from unhealthy behaviors. For example, 30% of cancer cases have been linked to tobacco use. The American Cancer Society recommends eating five fruits and vegetables daily, remaining at a healthy weight, exercising, and avoiding tobacco and heavy alcohol consumption in an effort to prevent some forms of cancer. Decreased exposure to environmental toxins is recommended for both children and adults.

There are a number of screening methods available to allow early detection or prevention of certain types of cancers. These screening procedures include mammograms, clinical breast examinations, Papanicolaou (Pap) tests for cervical cancer, prostate examinations, and fecal occult blood tests (to screen for colorectal cancer). The guidelines regarding the timing and frequency of these screening procedures can be found on the American Cancer Society's Web page or by consulting with a physician.

COPING WITH CANCER

The entire family is affected when a member is diagnosed with cancer. Common reactions to a cancer diagnosis can include shock, denial, anger, anxiety or fear, guilt, and sadness. Patients and family members, including children, frequently experience some or all of these symptoms. It is also common for children's behavior to regress (start acting younger than their age). Children and adults may feel overwhelmed by the stress of the cancer diagnosis and uncertainty over the future, or worry over upcoming treatment.

Many people cope with the uncertainty of cancer by learning as much as possible about the disease. This information can help in making treatment decisions and with relieving fears. Although parents naturally want to shield children from bad news, it is important to provide children with age-appropriate information about cancer. Research has shown that it is not helpful to try to hide cancer diagnoses from children because they can usually sense that something is wrong regardless of how careful adults are to keep information away from them. Furthermore, the attempted secrecy may produce more of an emotional burden by sending a message that the children cannot talk with their families about the illness.

During cancer treatment, social support is essential. Extended family members, religious organizations, and community agencies can provide resources to minimize the overwhelming strain on the family. Multidisciplinary teams to treat cancer also include personnel who can assist with the stress and emotions associated with a cancer diagnosis. A social worker, child life specialist, or psychologist can work with the patient and family to teach healthy coping strategies. It is essential that the patient, as well as the caregiver, take care of both physical and emotional needs during cancer treatment and recovery.

SURVIVING CANCER

Completing the stressful process of cancer treatment successfully is a huge accomplishment. However, adjusting to life after cancer can be stressful as well. Overall, cancer survivors are not different from healthy individuals in terms of psychological adjustment, but they have undergone a life-changing experience that may have impacted them for life. This impact can be positive, as in the case of many breast cancer survivors who reported that their relationships with other people improved following successful cancer treatment. For other people, the cancer experience has left them with physical or mental changes that may negatively impact their life. For example, some people have to adjust to life without a limb that was lost to amputation. Others, such as children who received high doses of radiation therapy at early ages, may face lifelong cognitive difficulties with sustaining attention, learning, and memory.

There is always some uncertainty about cancer recurring. Among children, secondary malignancies can result from the treatment of the first cancer. Each checkup and anniversary can be cause for great anxiety and subsequent celebration if the person remains cancer free. Cancer recurrences tend to elicit strong feelings of sadness, anger, and despair as families face repeating the entire treatment process again.

—Meredith L. Dreyer and Ric G. Steele

See also Breast Cancer, Prostate Cancer

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CARDIOVASCULAR DISEASE

Cardiovascular disease is a general umbrella term that refers to a group of disorders involving the heart and blood circulation systems, such as hypertension, stroke, congestive heart failure, cardiomyopathy, valvular heart disease, and coronary heart disease. Coronary heart disease refers to the narrowing or blockage of one or more coronary arteries by a gradual buildup of cholesterol within the artery wall (atherosclerosis), which reduces blood flow to the heart muscle. Coronary heart diseases include myocardial infarction and angina pectoris. Over 64 million Americans have some form of cardiovascular disease; coronary heart disease and stroke are the first and third leading causes of death in the United States, accounting for more than 40% of all deaths. Cardiovascular diseases also lead to high levels of premature and permanent disability.

SYMPTOMS

Cardiovascular disease encompasses a broad range of specific disorders, and symptom presentations vary widely across these disorders. Among the most common cardiovascular diseases, some can be asymptomatic (e.g., hypertension) while others can cause acute pain and disability (e.g., angina pectoris, myocardial infarction). Symptoms of cardiovascular disease can include chest pain or radiating pain on the left side of the body and nausea (coronary heart disease), weakness or paralysis on one side of the body (stroke), and painful breathing, fluid retention, and fatigue (congestive heart failure).

RISK FACTORS

Risk factors for cardiovascular disease include demographic factors, biological factors, and psychosocial factors.

Demographic Factors

Although cardiovascular disease occurs across the life span, the prevalence of most cardiovascular diseases increases with age. The prevalence of cardiovascular disease is slightly higher in women than in men, but the death rate for cardiovascular disease is substantially higher for women than for men. Women tend to experience some cardiovascular diseases, such as myocardial infarction, on average approximately 6 years later than do men. Rates for most cardiovascular diseases are higher for those of ethnic and racial minorities and those of lower socioeconomic status.

Biological Factors

Biological factors that predispose individuals to cardiovascular disease include family history of cardiovascular disease, diabetes, high blood pressure, high blood cholesterol, and overweight/obesity.

Psychosocial Factors

A variety of psychosocial factors place individuals at higher risk for developing cardiovascular disease. One of the biggest risk factors is depression or depressive symptoms, which is prospectively related to the occurrence of cardiovascular disorders such as myocardial infarction. One particular aspect of depression, hopelessness, has been linked to sudden cardiac death as well as to the development of coronary heart disease. Other negative emotions, such as anxiety (both disorders such as panic disorder and more general anxiety symptoms such as worry) and vital exhaustion (a syndrome of fatigue, irritability, and demoralized feelings) also present significant risk for developing cardiovascular disorders.

Earlier investigations of type A personality (a behavior pattern characterized by competition, hostility, time urgency, and excessive focus on work) seemed to indicate that type A was a strong risk factor for developing cardiovascular disease. More recent research, however,

indicates that rather than the entire constellation being predictive of cardiovascular disease, only certain of the type A traits serve as risk factors, particularly hostility. Hostility refers to a general negative orientation toward relationships with others and high levels of anger, cynicism, and mistrust. Hostility appears to be associated with the development and progression of cardiovascular disease, especially coronary heart disease. Recent research has identified anger as the most potent risk factor within hostility.

In addition to these psychosocial factors, lifestyle factors are strong predictors of cardiovascular disease. Tobacco use, physical inactivity, consumption of a high-fat, animal-based diet, excessive alcohol consumption, and poor stress management and coping skills are all risk factors for development and progression of cardiovascular disease.

Many of the identified psychosocial factors appear to contribute to cardiovascular disease through their influence on health behaviors. Negative emotions such as depression are related to higher levels of cigarette smoking, overeating, and increased alcohol use as well as lower levels of exercise and adherence with treatment. High levels of hostility are related to poorer interpersonal relationships and social isolation. In addition to these influences, many psychosocial factors exert their influence directly on physiological mechanisms, such as the neuroendocrine system, the hypothalamic–pituitary–adrenal axis, cardiovascular reactivity, endothelial function, inflammatory markers, platelets, coagulation factors, fibrinogen, lipids, and glucose metabolism.

PREVENTION AND TREATMENT

Prevention of cardiovascular disease can be greatly facilitated by the promotion of healthier lifestyles that involve higher levels of exercise and physical activity, maintenance of appropriate weight, consumption of a low-fat diet, and abstinence from tobacco products. Furthermore, regular medical checkups can lead to earlier interventions to treat underlying disease processes (e.g., diabetes, hypertension) and, when appropriate, prescription of medications such as beta-blockers and aspirin. Community interventions that promote healthier lifestyles such as more physical activity or reduced cigarette smoking may be particularly effective in reducing heart disease and stroke throughout entire communities.

Treatment of cardiovascular disease varies, depending on the particular disorder. For example, there are four basic ways to treat coronary heart disease: prescription of lifestyle changes, medication, minimally invasive interventional procedures, and surgery, all of which are designed to minimize symptoms and prevent myocardial infarction. Lifestyle changes involve increasing exercise, losing weight, eating a low-fat plant-based diet, and, if appropriate, making other changes (e.g., stopping smoking, keeping blood sugar under control). Medications that may be used to reduce coronary artery disease include cholesterol-lowering drugs, aspirin, beta-blockers, nitroglycerin, angiotensin-converting enzyme inhibitors, and other drugs that lower blood pressure. Minimally invasive interventional procedures include stent implantation and percutaneous transluminal coronary angioplasty (PTCA). A common surgery for coronary artery disease is coronary artery bypass surgery (CABG).

—Crystal L. Park

See also Stroke

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CAREER DEVELOPMENT

Career development is, for most people, a lifelong process of getting ready to choose, choosing, and, usually, continuing to make choices from among available occupations in our society. Each individual

undertaking this process is influenced by educational, economic, sociological, cultural, geographical, physical, psychological (e.g., interests, skills), and chance factors. Work may be defined as a productive, gainful activity in a job or profession. Work determines a person's worth and place in society, and it strongly influences one's sense of well-being as well as psychological identity.

Despite the centrality of work in the majority of people's lives and the apparent complexity of the career development process, a survey by the National Career Development Association indicated that only about a third of American adults were in their current jobs as a result of conscious planning. Thus, the majority of people chose a particular job because of chance circumstances. In addition, about 28% of those surveyed reported they would be changing their job within 3 years. Assisting a person through the career development process is the primary task of a vocational psychologist or a career counselor.

Vocational psychologists and career counselors use a variety of techniques and interventions to facilitate a person's career development. These techniques and interventions include individual and group counseling, workshops, mentoring, apprenticeships, internships, job shadowing, assessment (e.g., interests, skills, psychological needs), and use of career resources. One major source of career information is the Occupational Information Network (O*NET). O*NET is available on the Internet and is a comprehensive database system for collecting, organizing, and describing data on job characteristics and worker attributes. Generally, there are three major outcomes of career development interventions: (a) making a career choice; (b) development of decision-making abilities; and/or (c) better adjustment to the work situations, such as job success and work satisfaction. Career development theory serves to guide the vocational psychologist or career counselor in the selection of assessment instruments and techniques.

THEORIES OF CAREER DEVELOPMENT

Theories that explain career behavior provide the conceptual framework for career interventions. The following theories are generally considered to be the most influential theories of career choice and development in terms of research and practice. These theories are presented in chronological sequence beginning in the early 19th century.

Trait-and-Factor Theory

Frank Parsons, teacher, lawyer, engineer, and social reformer, spearheaded the vocational guidance movement. He was concerned with the exploitation of workers by industrial monopolists. This concern led him to propose a method to help individuals make wise vocational choices by first studying the person (e.g., aptitudes, interests, resources, limitations), then understanding the primary characteristics of occupations, and, finally, by matching the individual with the appropriate occupation. This process, called the trait-and-factor theory, became the origin of career counseling and is still in use today. The assumption is that traits are stable and can be reliably and validly measured (the word *factor* is just a form of statistical evidence that a trait exists). Therefore, assessment instruments on such traits as interests, values, decision-making style, and preferences for work activities were developed that are quite useful in counseling. This theory also led to the study of various job requirements. However, this theory is static in that it does not account for changes in values, achievement, skills, and personality characteristics over a person's lifetime in addition to the impact of major life events (e.g., childbirth, divorce). Thus, this theory is generally considered to be limited.

Ginzberg's Theory

In contrast with the static view of the trait-and-factor theory, Ginzberg, Ginsburg, Axelrad, and Herma viewed career development as a lifelong process beginning in early childhood. Ginzberg and his colleagues see three stages in the career choice process, each with substages. The first is the fantasy stage (childhood before age 11), in which play activities gradually become more work oriented and reflect the child's initial preferences for certain types of activities. The tentative stage (from ages 11 through 17) is divided into four substages named interest, capacity, values, and transition. During the tentative stage, the person becomes more aware of his or her interests and abilities, types of work requirements, and vocational preferences. During the last stage (ages 17 to young adult), the person narrows his or her career choices by taking into consideration occupational interests and perceived abilities and then selects a job or begins advanced training. In the 1980s, Ginzberg noted that older adults may reassess their career goals and make a career change.

Super's Theory

Donald Super also recognized the changes that people go through as they mature. Career patterns are influenced by many personal characteristics, economic factors, psychological factors, and physical abilities, as well as chance factors. Super theorized that people seek satisfaction through work roles in which they can develop their self-concept. In fact, Super asserted, "the process of vocational development is essentially that of developing and implementing a self concept." Career maturity, a primary concept of Super's theory, is manifested in the successful achievement of age and stage development tasks across the life span. This developmental theory has five major stages. During the Growth stage (birth to age 14 or 15), the child forms his or her self-concept, which is associated with the development of abilities, attitudes, interests, and needs. The child also forms a general understanding of the world of work. In the Exploratory stage (ages 15 to 24), the individual makes a tentative career choice with related skill development. The Establishment stage (ages 25 to 44) is characterized by work experience. From ages 45 to 64, the Maintenance stage, the person experiences a continual adjustment process to improve the working situation. The final stage is named Decline (65+), during which there is reduced work output and eventual retirement. Super's theory has been refined and expanded over the years. For example, although Super originally presented the stages and tasks in a sequential manner, he later added that we cycle and recycle through the stage throughout our life span.

Super identified six factors in vocational maturity: (1) awareness of the need to plan ahead, (2) decision-making skills, (3) knowledge and use of information resources, (4) general career information, (5) general world-of-work information, and (6) detailed information about preferred occupations. Super also examined the various roles that we play during our lifetimes and how the relative importance of those roles changes over time. Super's theory has increasingly been viewed as the most comprehensive of the developmental approaches.

Roe's Theory of Early Childhood Influences on Career Choice

Anne Roe's theory focuses on early family relationships and their influence on career choice. Occupations are classified into two major categories: person-oriented and non-person-oriented. However, empirical research has failed to support Roe's theory. The major contribution seems to be the emphasis on childhood experiences on career development and her job classification system.

Theory of Work Adjustment

In the theory of work adjustment (TWA), Dawis and Lofquist focus on the major construct of correspondence. Correspondence is the fit between what a particular occupation requires and an individual's attributes. Work adjustment is the dynamic process by which persons attain and preserve correspondence with their work environment. Thus, high correspondence is hypothesized to result in longer tenure on the job (the chief outcome of correspondence and work adjustment), better performance on work-related tasks, and greater job satisfaction. Given these major assumptions and concepts, 20 major propositions have been developed to predict work adjustment. However, few of these propositions have been examined empirically. Those studies that have been done used designs that do not use causal influence, even though TWA posits work adjustment as a continuous, dynamic process.

Holland's Theory

John Holland's typological theory was developed to organize the data about people in different jobs and the data in different work environments. According to Holland, people function best and find satisfaction in work that is compatible with their personalities. Thus, he developed six personal styles and six matching work environments: realistic, investigative, artistic, social, entertaining, and conventional (often referred to by the acronym RIASEC). People tend to choose a career that is reflective of their personality. Holland suggests that the closer the match of personality to job, the greater the satisfaction, congruence, and persistence. All six types are a part of each of us. However, one to three types are usually evidenced more strongly. A brief overview of the RIASEC types, six work-related activities, and sample occupations is presented in Table 1.

Holland and his colleagues have developed a number of instruments designed to identify individual personality traits and match those traits to occupational groups. These instruments include the Self-Directed Search, My Vocational Situation, and the

Table 1 RIASEC Activities and Sample Occupations

Type	*Activities*	*Occupations*
Realistic	Working with things	Carpenter Mechanical engineer
Investigative	Working with information	Chemist Psychologist
Artistic	Creating things	Writer Painter
Social	Helping people	Social worker Counselor
Enterprising	Leading others	Sales representative Entrepreneur
Conventional	Organizing data	Secretary Auditor

Vocational Preference Inventory. Holland's theory has generated a vast amount of research and has had more influence on career research and practice than any other career development theory.

Krumboltz's Social Learning Theory of Career Decision Making

John Krumboltz's theory of career development has roots in classical behaviorism, social learning theory, cognitive behavioral theory, such as that proposed by Beck and Ellis, and self-efficacy theory proposed by Bandura. Many factors that have an impact on career decision making are incorporated into this theory. First, genetic factors may expand or limit an individual's options. These genetic factors may include sex, race, and developmental disabilities, as well as those innate capabilities or talents that a person may choose to develop. Second, environmental conditions and events beyond a person's control such as the economy, cultural norms, or even geography may have an impact on career decisions. Individual learning is the third factor. For example, good work habits (punctuality, organization, etc.) and problem-solving skills may be acquired or there might be a failure to acquire these skills. The person may also have some life experiences that are rewarded and lead to a specific career interest. For example, having a parent who is a lawyer may lead to an interest in law as a career. Finally, Krumboltz's theory focuses on self-observation generalizations or comparing one's performance, abilities, and skills to some standard to draw conclusions about one's own competence and worth. These conclusions are used in making responses to future situations. If the conclusions are unrealistic, this may negatively affect the image of the self as a worker. For example, a belief that one is not good in mathematics is likely to result in avoidance of any math-related activities and career possibilities. Overall, Krumboltz views career development as unique for every individual, and most of the influences on career development (e.g., self-concept, interests) can be changed at any point in life.

Career Self-Efficacy

Bandura's social cognitive theory focuses on the central role of self-efficacy (SE) beliefs in influencing and guiding important aspects of psychosocial functioning, including career-related behavior. SE expectations are defined by Bandura as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances." These SE expectations are hypothesized to help determine whether a particular action will be initiated, as well as effort expenditure, persistence, and emotional reactions when confronted by obstacles. SE is a dynamic aspect of the self-system that is specific to a particular behavioral domain. Thus, a person can have high SE in regards to achievement in athletics, but not in the area of an academic subject such as mathematics.

Hackett and Betz were among the first researchers to recognize the importance of the SE construct to career development. They developed an extension of Bandura's theory and posited that SE influences the career decisions, achievements, and work adjustment behaviors of both men and women, although the influence may be greater for women. There is growing support from the empirical literature to support the extension of SE theory to career-relevant behavior. For example, in a meta-analytic review of the academic SE literature, Multon, Brown, and Lent found effect sizes of 0.38 and 0.34 for the relation of SE to measures of academic performance and persistence, respectively. Some conclusions can be gleaned from this empirical literature: (a) SE beliefs influence career entry indexes (e.g., range of career options, persistence in education, career indecision), (b) SE relates to important work adjustment outcomes such

as job performance and coping with job loss, and (c) gender differences in SE often explain the male-female differences in occupational choices.

Other Noteworthy Theories

Other theories of career development (listed chronologically) include the work of Tiedeman and his colleagues on the career decision-making process, the psychoanalytic approach of Bordin, Nachmann, and Segal, and a theory of circumscription and compromise in career aspirations. Tiedeman's holistic theory served to highlight the importance of self-awareness in career decision making. However, it has little empirical support. Bordin and his colleagues hypothesized that psychoanalytically developed need dimensions are established by the age of 6, and these need dimensions influence career choice. Thus, the major contribution of this theory has been to note the importance of early child-parent relationships and development processes to career development issues. Gottfredson contends that occupational preferences emerge from the complexities that accompany mental and physical growth. She postulates that during self-concept development, an individual will narrow career aspirations according to sex-type and prestige. Compromise is also used in decision making in that a person may settle for a less compatible but more accessible career choice.

Convergence of Career Development Theories

Osipow argued that major career development theories are converging as empirical evidence about vocational behavior accumulates and theories are continually revised. His analysis of four of the major theories (those of Super, Holland, Lofquist, and Davis and Krumboltz) extracted common themes. These themes include the influence of both biological factors and parental upbringing, personality factors, and life-stage influences.

Several researchers (such as Hackett, Lent, and Greenhaus) argued for the need to work toward unifying career development theories. Major variables crucial to a comprehensive theory of career development need to be identified and defined. A unifying theory would bring together conceptually related constructs such as SE and self-concept as well account for the relationships among diverse constructs (e.g., interests, needs, abilities). To be truly comprehensive, variables that have received little attention in current theories need to be included. These may include what opportunities are available within a particular geographic area, the influence of life roles (e.g., racial identity, sex role, parent role), and economic influences. It must be noted, however, that such a comprehensive theory would pose barriers in both research and practice because of the number of major constructs and the complexity of the interrelationships among constructs.

CAREER DEVELOPMENT NEEDS OF SPECIAL GROUPS

There are some groups of people for whom certain conditions or circumstances may require some variation in the usual career development process. Of course, the career development process will be somewhat individualized due to the unique characteristics and circumstances of each person, but there are commonalities generally shared within groups of people. Groups that may experience some different circumstances with regard to the career development process include women; racial and ethnic minority groups; delayed entrants into the workforce (e.g., displaced homemakers, returning military personnel, prior offenders); midlife career changers (whether voluntary or involuntary), older workers; and gay, lesbian, bisexual, and transgendered individuals. The exploration of group differences can advance the understanding of career development, although it must be noted that research has shown that differences between persons within a particular group typically exceed the degree of difference between groups. Therefore, it is important for the vocational psychologist or career counselor not to extend these findings rigidly when working with individual clients. In this section, some of the salient issues for three of these groups (i.e., women, racial and ethnic minority groups, and persons with disabilities) will be addressed here.

Women's Career Development

Compared with men, women may experience some barriers to their career development that have not been adequately addressed in the major career theories. For example, Farmer originally proposed a set of seven internal and external factors that inhibit women's career progress: academic self-confidence, myths about women and work, fear of success, home-career conflict, vicarious achievement motivation (i.e., feeling it is more

important to focus on the career progress of a spouse or children instead of one's own career progress), lower risk-taking behavior, and sex-role orientation. As Farmer refined her model, she included background variables (sex, race, age, socioeconomic status [SES], ability) that are hypothesized to influence personal variables (academic self-esteem, values, attributions, and independence) and environmental factors (parental and teacher support)—all of which, in turn, influence the motivational variables of level of career aspirations, mastery strivings, and commitment to career. Betz and Fitzgerald comprehensively reviewed the research on the career psychology of women and summarized the literature by proposing four sets of factors that positively influence women's career choices: (a) individual variables (high self-esteem, high ability, liberated sex-role values, strong academic self-concept, androgyny); (b) background variables (working mother, supportive father, highly educated parents, female role models, work experience as an adolescent, androgynous upbringing); (c) educational variables (women's schools, advanced work in mathematics, higher education); and (d) adult lifestyle variables (late marriage or single, no or few children). Betz and Fitzgerald proposed a causal ordering of these variables, and Fassinger tested the model using sophisticated empirical methods. Fassinger's findings indicated that higher ability levels, in complex interaction with liberal sex-role attitudes, positively influence career orientation and career choice.

Career Development of Racial/Ethnic Minorities

Research on race/ethnicity and career development has fluctuated widely over the years, but in recent years there is a renewed interest in cultural, racial, and ethnic variables in career development. While there are no comprehensive models of minority career development, there are literature reviews on specific minority groups (e.g., African Americans, Hispanic Americans, Asian Americans) to guide both research and practice. Different cultures may have different conceptions of the family, gender roles, and work-family relationships. For example, *career* may have a collective and not an individual meaning. Although it is important to understand the meaning of work, career, and other related concepts to an individual's racial or ethnic group, it is also important to assess the salience of membership in the cultural group to better understand the person's career behavior.

Career Development for Persons With Disabilities

A person with disabilities is someone generally considered different physically and/or psychologically from most people because of birth, developmental difficulties, accident, or illness. It should be noted that these disabilities may or may not prove to be a vocational hindrance. The Americans with Disabilities Act of 1990 had a major impact on work for persons with disabilities. This act makes a distinction between essential and nonessential job functions, and an employer may only consider the essential functions when hiring or promoting people. Thus, the current disability policy of the United States focuses on the inclusion, independence, and empowerment of persons with disabilities.

CAREER COUNSELING

Career counseling helps people to select careers, find the right job (e.g., by practicing interviewing skills, providing guidance on job applications), manage multiple roles and stressors to enhance adjustment to the workplace, and make decisions regarding retirement. Career counseling first began more than 100 years ago. The National Career Development Association has defined career counseling as "consisting of those activities performed or coordinated by individuals who have credentials to work with other individuals or groups of individuals about occupations, life/career decision making, career planning, career pathing, or other career development related questions or conflicts." In recent years, the relationship between personal and career counseling has been recognized to emphasis the importance of the person's vocational role with overall psychological well-being. For example, Multon, Heppner, Gysbers, Zook, and Ellis-Kalton empirically explored psychological distress as a variable in career counseling. Their results showed that in their sample, 60% of the career clients were psychologically distressed (e.g., anxiety, depression) and that career counseling significantly decreased their level of distress. Thus, career counseling can also have a positive impact on psychological health and interpersonal relationships. This awareness of the need for career counselors to develop competencies to work with increasingly complex issues has resulted in the National Career Development Association developing a list of competencies for career counselors. This list outlines an array of skills including both individual and group counseling skills in addition to legal and ethical issues in the field.

As noted earlier, Frank Parsons was the first person to focus on the importance of vocational guidance, and he is sometimes referred to as the father of career development. His three-step procedure (a trait-and-factor method) for working with immigrants seeking employment in the late 1800s and early 1900s was outlined in his book *Choosing a Vocation,* which was published posthumously in 1909. Parsons wrote, "In the wise choice of vocation there are three broad factors: (1) a clear understanding of yourself, your aptitudes, interests, ambitions, resources, limitation, and their causes; (2) a knowledge of the requirements, conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work; and (3) true reasoning on the relations of these two groups of fact" (p. 5). Parsons's method had a lasting impact on how career counseling was conducted for a long period of time in the United States and continues to be influential in today's practice of career counseling. While all the theories of career development described earlier have had an impact on how career counseling is conceptualized and conducted, none have had as much of an influence on career research and practice as the work of John Holland.

The term *career counseling* has been used to describe a great variety of interventions, including individual career counseling, group interventions, classes, one-time workshops, or the use of computerized career information and guidance systems. Spokane and Oliver conducted a meta-analytic study to examine the effectiveness of a number of career interventions across a large number of studies. They reported an overall effective size for career interventions of 0.85, with group interventions having a greater effective size (1.11) than individual interventions (0.87). In 1988, the same authors conducted a second meta-analytic investigation of more recently published empirical studies and found career exploration classes to have the greatest effect size, followed by group test interpretation, workshops, and individual counseling. While it appears career counseling is effective overall, the aspects of career counseling that contribute to this effectiveness are less clear. Although some research has been conducted in this area, conclusions have not been reached.

CURRENT TRENDS IN CAREER DEVELOPMENT

The world of work has been changing very rapidly in the past few decades. There is ever-changing technology, shifting requirements for worker knowledge and skills, and a global labor surplus. All these changes are likely to affect the career development of individuals across the life span. Current trends in the area of career development include the following:

1. There is a greater awareness of the need to attend to career development issues across the life span. With this awareness comes an increase in the career development programs available. These programs are in a wider variety of settings and are available from a wider range of personnel. These settings include business and industry, hospitals, prisons, and even shopping centers. Traditionally, counseling psychologists, college counselors, employment (or career) counselors, school counselors, and rehabilitation counselors have provided career development services, but now other groups have become more interested in the area. These include industrial psychologists, social workers, and mental health counselors. This burgeoning interest in career development has generated an increased interest in credentialing career counselors.

2. There continues to be a greater focus on career transitions (e.g., school-to-work transitions, midlife career transition, involuntary job loss).

3. Substantial changes will continue to occur in the economic, occupational, industrial, and social environments, and these changes will influence individual career development. For example, the use and sophistication of technology have increased dramatically. New jobs are created and the need for other jobs are reduced or even eliminated, thus requiring more workers to change jobs or even move to another occupational group.

4. Along with more sophisticated technology and work procedures, there is a greater need for a better educated workforce. There are fewer opportunities for an unskilled workforce because the jobs they do are done for less money in underdeveloped countries.

5. There will be more participation in retraining programs to develop new skills and update and enhance current skills due to changing job opportunities.

6. It is likely that flexibility in work schedules (e.g., job-sharing, part-time, 4-day work weeks with 10-hour days) will increase, giving more options to workers with particular needs, such as mothers with young children. More workers will also spend at least part of their time working from home.

7. There will be even greater attention to the career development of a more diverse population. The workforce today includes more women (including mothers of young children), members of racial and ethnic groups, openly homosexual and bisexual individuals, and persons of various types of disabilities (e.g., cognitive deficits, physical limitations, mental illness).

8. Of increasing concern will be the impact of employment and unemployment on mental health. The interaction between interests, personality characteristics, and variables in the work setting (e.g., environment, type of supervisor) may result in certain mental health problems (e.g., depression, anxiety, increased interpersonal sensitivity). Similarly, the loss of employment may produce certain adjustment problems for both the worker and his or her family.

9. As the "baby boom" generation approaches the traditional retirement age, more research has been generated concerning decisions regarding when to retire and how to plan for retirement. Financial status is a critical factor in the decision to retire, but other factors such as health problems and psychological issues also play a role.

10. There will be a greater emphasis on work adjustment factors, particularly as they relate to productivity and quality.

—Karen D. Multon

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CASE STUDY

A case study is a research technique used to study an individual or group providing intense description and analysis. This particular method was the cornerstone of Freud's work in his psychodynamic theory; his classic case study of "Little Hans," a child terrified of horses, was used to demonstrate how psychological difficulties of an individual can be interpreted to explain basic psychological and developmental processes. Case studies, however, are not limited to pathology; Piaget used the intense observation characteristic of the case study with his own children to develop his stage theory of cognitive development. Additionally, case studies are not limited to the individual. Study of a group, even if large, offers insights into the impact of various cultural and historical events. For example, studying the coping of the rescue workers, survivors, and witnesses on the scene of the Murrah Building bombing in Oklahoma City provided mental health professionals a starting point when they arrived on the scene of the World Trade Center attacks.

The best understood advantage of the case study is the opportunity to study rare phenomena. For example, genius in children is often studied using case studies. Case study can offer valuable insights into the parameters of giftedness in children and, for example, its impact on social behavior.

A second advantage is that case studies of people in extreme circumstances offer an opportunity for developmental researchers to address questions that would be unethical to study otherwise. For example, a central question in language development is whether a critical period exists: do children have to be exposed to language by puberty to develop language? "Genie" was approximately 13 when she was found by social services, having had virtually no human contact or exposure to language since she was 2.

Genie's case demonstrates the third and perhaps most powerful advantage of the case study. The case study offers the possibility of challenging a theory if it violates a critical, general proposition of the theory. Because

Genie was capable of developing some language, her case offered a refutation of the absolute view of the critical period theory that language would not be acquired at all without exposure during this critical period.

The disadvantages of the case study method are threefold. First, there is typically a considerable lack of control in the case study, usually because nature provides the arrangements rather than a researcher. For example, Genie suffered such extreme emotional deprivation that her failure to develop normal language cannot be solely attributed to the critical period theory.

Second, the ability to generalize from a case study is limited. If the researcher is investigating developmental phenomena that are considered to vary from one individual to another, such as personality, it is impossible to claim that a case study of one individual is representative of others.

Third, the data collection process itself in case studies is open to bias and distortion, albeit unintentional. Much case study data come from archival data and observation. It is difficult to avoid systematically recording those events and behaviors that are consistent with the hypothesis being investigated. However, it is important to note that this disadvantage is by no means limited to the case study.

In conclusion, it is important to understand both the benefits and problems of the case study methodology. The case study method is typically considered an exploratory method useful for generating new hypotheses but hampered by issues of generalizability and control. Case studies are perhaps best thought of as complementary to the other research methodologies as opposed to an inferior alternative.

—Melinda C. R. Burgess

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CATEGORIZATION

In cognitive psychology, categorization focuses on how knowledge is organized. Objects in the same category are likely to share certain attributes, and category membership allows inferences to be drawn. The term *category* refers to a set of things (objects, ideas, events) that are grouped together. The term *concept* often refers to the mental representation of such knowledge.

Categorization has obvious functions for learning, organizing, and storing information. From an evolutionary standpoint, it benefits an individual to be able to amass as large an amount of information with the least amount of effort or time. By grouping known items together, one can better identify novel items as well as predict some of their likely attributes.

Neuroscientific studies support an underlying categorical organization for semantic knowledge in the human brain; subjects with neurological damage can lose the ability to retrieve categorically selective information. For example, a person may be able to name tools or utensils, but not animals or fruits. These specific deficits point to a key organizational role for categorization in cognitive processing.

Categorization is a process that occurs cross-culturally as well. But while some objects tend to be universally grouped together, such as shapes and colors, others may be grouped differently as a function of cultural background. Consider a classification task for the items *shovel*, *hoe*, *dirt*, and *hammer*. Someone from an industrialized background with formal education might use a taxonomic grouping and thus omit *dirt* because it is not a tool. Someone from an agrarian background without formal education might use a thematic grouping and thus omit *hammer* because the other items are used together.

LEVELS OF CATEGORIZATION

Many items can be categorized hierarchically, and the following scheme is often used in describing this organization:

Superordinate—The superordinate level is a broad, inclusive level in the hierarchical scale of categories (e.g., animal, vehicle). Often the superordinate level will consist of several basic-level categories.

Basic—The basic-level category (e.g., cat, boat) is often used when one labels an object. Items within a basic-level category share many features in common and are distinct from items in other basic-level categories. Researcher Eleanor Rosch argued for the primacy of basic-level categorization in early development.

Subordinate—Subordinate-level categories offer a more specific breakdown within a basic level category (e.g., tabby [for cat], canoe [for boat]).

THEORIES OF CATEGORIZATION

Researchers continue to debate various theoretical approaches for describing categorization processes. Most theories can be classified as either similarity based or explanation based.

Similarity-Based Categorization

The classical defining-attribute theory identifies members of a category based on certain traits that all items have in common. The set of common attributes is both essential and sufficient for an item to be included in the category. All squares have four equal sides and four 90-degree corners. A shape that does not meet all the standards is not a square. This all-or-none explanation implies that no item within a given category is more representative of that category than another item. This theory has been disputed on the basis that most categories are not clearly marked but rather have fuzzy boundaries. Philosopher Ludwig Wittgenstein used the example of games, pointing out that among all possible games (those with boards, balls, cards, sticks, etc.) no set of features is necessary or sufficient for a particular game's inclusion or exclusion.

The prototype theory states that because there are no absolute boundaries, some items of a category are indeed more representative than others. The theory explains that a set of characteristic attributes, not defining attributes, is what identifies objects as belonging to a category. A prototype is created by averaging features together to create a typical or central example. Rosch cited one example as the category *birds*, stating that *robin* is far more "typical" than *penguin* and thus closer to the prototype, because it contains more of the characteristic attributes. The research finding that people are quicker to judge a robin as a bird than a penguin as a bird has been used to support this theory.

The exemplar theory states that we categorize items based on examples, rather than on a prototype that becomes abstracted over time. In other words, people are capable of drawing on multiple instances when locating or placing an object into a particular category. The mental representation of the category is presumed to contain information from various specific exemplars.

This theory is consistent with the finding that understanding variability and typicality of instances within a category plays a role in predicting category membership.

Explanation-Based Categorization

Instead of emphasizing similar features, explanation-based approaches define categories based on theory-driven inferences. For example, categories may be based on nonobvious features, such as the presumed internal characteristics that differentiate animate from inanimate objects. Also, ad hoc categories that ignore perceptual similarity can be created, such as the category *things at a yard sale*. These categories cannot be explained using a similarity-based view, but instead require fundamental theoretical knowledge.

THE DEVELOPMENT OF CATEGORIZATION

Questions about the development of categorization help us characterize how infants and children understand their worlds and provide information about the building blocks of adults' cognitive skills.

Current research explores some critical questions about how categorization and conceptual processing develop. For example, do infants first recognize basic-level categories, followed by elaboration of the hierarchical organization of superordinate categories? Does development proceed from perceptually based categories to conceptually defined categories?

Psychologist Eleanor Gibson argued that laboratory studies of categorization often focus on static presentation of visual stimuli (e.g., pictures), whereas infants in the real world use dynamic information from various modalities. She emphasized the benefit of a symbiotic connection between perception and action. Acting on an object provides more information about it, and its perceptual characteristics allow for plausible actions. She proposed that perception is not separate from meaning, and thus the distinction between perceptual and conceptual categorization may be unnecessary.

Categorization in Infants

Studying categorization in infants requires methods that do not rely on verbal explanation. In one popular method, infants are shown a series of objects from the same category (e.g., cats) and the time that they look at each item is measured. The subsequent test measures how long the infant looks at a novel member of that same category (cat) compared to how long they look at a novel member of a different category (e.g., rabbit). The inference is that a preference for the novel category demonstrates the infant's categorization of the initially presented category.

Using this method, researchers have demonstrated that infants as young as 3 months can discriminate

categories such as shapes, colors, and animal types. Between 6 months and 1 year, infants attend to categories such as vehicles, tools, facial expressions, and gender.

Researchers propose that early conceptual understanding occurs for distinctions such as animate versus inanimate objects, and that infants begin to categorize based not only on perceptual appearance, but also on function. During the second year, infants can group toys with different attributes into different piles, actively demonstrating their categorization skills. As linguistic skills develop, children's abilities can be tested with verbal tasks.

Categorization in Childhood

Later in childhood, hierarchical classification skills emerge. Rosch found that preschool-aged children are more adept at sorting objects at the basic level than at the superordinate level. Children's language learning and adults' labeling of objects to children follow this same trend. Other researchers suggest an early appreciation of more global characteristics of object categories.

The development of explanation-based categorization has also been studied. For example, researcher Frank Keil tested children with stories about an animal (e.g., raccoon) that was physically transformed to look like a skunk. Preschoolers tended to be fooled by appearance, but second-graders were able to classify the animal using internal characteristics.

Categorization and Language Development

Another area of debate is the developmental connection between categorization and language. This debate reflects the classic distinction between theorists Lev Vygotsky and Jean Piaget on the connection between language and thought. That is, do children's linguistic processes (e.g., labeling) simply reflect their level of cognitive understanding of categories, or does the acquisition of language influence and facilitate developing processes of categorization?

Researchers have proposed that linguistic development is important in categorization and conceptual development because the use of a common label (e.g., *vehicle*) across multiple things (e.g., boats, planes, cars) highlights common features of the category and allows for inferences about internal and functional properties. Many studies reveal young children's ability to link language and concepts. For example, children's sensitivity to linguistic distinctions has been revealed through the use of nonsense phrases such as "this is *a* nax" versus "this is *some* nax"; they correctly map the first label to the count noun (e.g., a whole object) and the second label to the substance of a mass noun (e.g., sand).

SUMMARY

Categorization is a fundamental aspect of cognition, and there is growing interest in the organization and mental representation of categories. Perceptual categorization is evident early in infancy. Preschool-aged children categorize adeptly, use concepts for inductive reasoning, and notice linguistic cues for categorization. During middle childhood, theory-based reasoning continues to unfold and hierarchical classification is evident. The mental representation of categorical knowledge in children and adults continues to be debated, and each of the various theoretical approaches has advantages and disadvantages.

—Marie T. Balaban and Audrey L. Oldham

Further Readings and References

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CATHOLICISM

Catholicism is a Christian religious tradition that has as its central belief that Jesus Christ is both God and man; that he is the Son of God and freely chose to become man to be the Savior of humankind.

Catholicism dates back to the time of Christ, and early Church records show the use of the term Catholicism in 2 AD. Consistent with Protestant Christian denominations, those who profess this faith, Catholics, are monotheistic (believe in one God) but also believe in the Holy Trinity (there is only one God, but He is made up of three persons: God the Father, God the Son, and God the Holy Spirit). Unique to Catholicism is that its leaders (the Magisterium) can trace their roots back to the original followers (apostles) of Christ. This is what Catholics mean by the term apostolic tradition. There are both Western (Latin or Roman) and Eastern (Byzantine) rites of the Catholic Church, and both are led by the head of the Magisterium, the Pope.

The term *Catholicism* literally means "universal" and expresses a particular worldview that includes the belief that Jesus Christ died for all of humankind. Catholics share various beliefs and ways of worship, as well as a distinct outlook on life. Catholicism recognizes that for each human being there is a unity of the body and soul. The physical world of the body is viewed as part of God's creation and is considered inherently good until misused by individual choices. Thus, inherent in Catholicism is the belief that people are intrinsically good, but that sin (any act against God) can wound or kill a person's soul. Sin is only cured by God's divine grace (supernatural gift from God to aid humankind on their journey to God) that is best received through the sacraments such as baptism, communion, and marriage. Sacraments are visible, outward signs of God's inward grace, instituted by Christ, to aid humankind on their journey toward sanctification. The sacraments allow individuals to "see" the invisible grace of God.

BASIC TENETS

The Catholic faith is based on God's revelation that comes from two sources: the Bible and sacred tradition, the written and the unwritten word of God. Catholics believe that the Bible is the inspired and revealed word of God. Sacred tradition is the "deposit of faith" (the teachings of the Church) that has been passed down through the ages by the Church leaders. Because stories were first told orally, sacred tradition serves as the basis for the Bible before it was put into text. The Apostles' Creed, an oral statement of faith often repeated aloud during church ceremonies, is an example of this sacred tradition and summarizes what Catholics believe as divinely revealed truth. Another basic tenet of the Catholic faith is that baptism, a ceremony involving water for the forgiveness of sins and the rite of becoming a Christian, is necessary for salvation, as well as that God's Ten Commandments, as presented in the Bible, provide a moral compass by which to live.

The Four Hallmarks of the Church

The four hallmarks of the Catholic Church include the belief that it is "one, holy, catholic, and apostolic." These beliefs are contained in the Nicene Creed (the profession of Christian faith approved at the Council of Constantinople in 381 AD) and are recited each Sunday at Mass. The Creed is a synopsis of all the core beliefs of Christian dogma common to the Catholic Church and formulated by sacred tradition (part of the unwritten word of God).

The first hallmark is unity. This unity is expressed at multiple levels across liturgy, doctrine, and authority. The same seven sacraments that mark the major stages of development are celebrated by Catholics around the world and are drawn from the same deposit of faith (sacred oral tradition + sacred scriptures). Both the Western (Latin) Church and the Eastern (Byzantine) Church are led by the one supreme pontiff, the Pope. The hallmark of unfailing holiness stems from the Church being united by Christ and sanctified by Him. The Catholic Church is considered the bride of Christ as well as the embodiment of the mystical body of Christ. Consequently, the Church as a whole cannot sin, but individual members are capable of sin. The holiness of the Church is articulated in daily prayer and through the celebration of the Mass. The third hallmark of the Church is catholic, meaning universal or according to the totality. That is, Christ is present in the Church and because of this, the Church bears and administers the totality of the means of salvation. The Church is also sent on a mission to the whole of humanity. By *apostolic*, it is meant that the Church can trace origins back to the original 12 apostles that Christ chose to lead His Church.

Catholics have at the source of their beliefs both the written and the unwritten word of God. The revealed truth is expressed in the Bible as inspired, infallible, and inerrant. Likewise, the unwritten word of God is expressed through sacred tradition. The Apostles' Creed is an example of sacred tradition and summarizes what Catholics believe as divinely revealed truth.

There are 12 articles of faith in Catholicism that when put together constitute the Apostles' Creed. This

Creed contains all of the basic tenets of Christianity. Article 1: "I believe in God the Father, almighty, creator of heaven and earth." Here it is affirmed that God exists and created everything from nothing in the universe. Article 2: "And in Jesus Christ, his only Son, our Lord." This statement highlights the divinity of Jesus as savior or anointed one. Article 3: "Who was conceived of the Holy Spirit." Here the human nature of Christ is articulated as he had an earthly mother, Mary, but no earthly father. His divine nature is reinforced by this statement where He is considered both God and man. Article 4: "He suffered under Pontius Pilate, was crucified, died, and was buried." Christ's human nature is stressed again in this statement, and his death is placed in earthly context giving it a specific time and place in history. Ultimately, this places Christ's death on all humanity. Article 5: "He descended into hell, the third day He rose again from the dead." Prior to the Messiah coming to open the gates of Heaven, souls were gathered in the world of the dead. Catholics believe Christ literally died and rose again 3 days later by his own accord to open the gates of heaven. Article 6: "He ascended into heaven and sits at the right hand of God the Father almighty." This clause asserts that Jesus remains intimately connected to His human body and went body and soul into heaven, providing hope for humankind to follow in His path. Article 7: "From thence he shall come again to judge the living and the dead." The Second Coming of Christ as judge at the end of time is expressed here. Catholics believe in a personal judgment that will occur at the end of their life as an accounting for how they lived their life. Those who are unpure will be purified in an intermediate place, known as purgatory, in preparation for heaven. Then at the end of time, God will disclose everyone's private judgment for eternity. Article 8: "I believe in the Holy Spirit." Here the concept of the Blessed Trinity is highlighted as God existing in three divine persons: God the Father, God the Son, and God the Holy Spirit. Thus, Catholics affirm their belief that He is truly one God in three divine persons. Article 9: "(I believe in) the holy Catholic Church, the communion of saints." Here the Church is highlighted as a necessary component of the continuation of Christ's mission to teach, sanctify, and govern. The teaching authority of the Church, the Magisterium, continues this mission through sanctification through the celebration of the sacraments. Through the use of hierarchy, the Church continues the mission of governing the faithful. The communion of saints serves as a reminder that the Church is composed of those baptized on earth, but also those in purgatory, as well as those in heaven. Article 10: "(I believe in) the forgiveness of sins." This belief is essential for all of Christianity in that Christ came for sinners to realize His mercy and forgiveness. Article 11: "(I believe in) the resurrection of the body." An intimate and inseparable connection between the soul and body exists in Catholic thought. At death, the body is temporarily separated from the soul, but will be united on the last day as both body and soul go into heaven or hell. Article 12: "(I believe in) life everlasting." This final article of faith explains the belief in a reunification between the soul and body for all eternity.

The Holy Eucharist, the belief in Christ's real presence under the appearances of bread and wine, serves as the source and summit of all Catholic beliefs. Catholics believe that the Eucharist is the literal body and blood of Christ and therefore believe that Christ is present in both forms during each Mass. Because *Eucharist* means "thanksgiving," Catholics express their thanks to God for providing the body and blood of Jesus to nourish their souls. The Eucharist is also present during Mass when the bread and wine are consecrated as Holy Communion and outside of Mass under the title of the Blessed Sacrament.

MAJOR PRACTICES

The Mass is the most important, central, and sacred act of worship in the Catholic faith. The key to this understanding is the belief by Catholics that the bread and wine are transformed into the body and blood of Christ, the Holy Eucharist. This transformation can only occur by means of the Mass, so therefore, Catholics offer the same degree of reverence and adoration that is due God the Almighty. Because of the significance of the Mass, it serves as the primary worship ceremony for the Catholic Church and is celebrated all over the world, in exactly the same way, every day of the week. To understand the Mass is to understand Catholicism because it exemplifies the beliefs, actions, and techniques associated with the faith. For example, more than just mere physical attendance of the congregation is required at a Catholic Mass. By singing, praying, speaking, sitting, and kneeling, Catholics fully, actively, and consciously participate in the celebration. Through these series of interactions, an intimate communication is established between the priest and the people. Another key aspect to understand about the Mass is that it is

not just a reenactment of the Last Supper. In the Mass, the past, present, and future are all united at the same time. The past is remembered by reciting the words of Jesus, "This is my body, this is my blood." Graces, spiritual nourishment, and instruction for the people participating are offered in the present, whereas the future foreshadows the sacred banquet in heaven.

Because the Mass is so critical to Catholic worship, it is referred to as the sacred rite, or the formal, official worship service of Catholicism. The Mass is composed of two parts, the Liturgy of the Word of God and the Liturgy of the Eucharist. Every prayer and sacrament begins and concludes with the priest and individuals using their hands to make the sign of the cross, and the Mass follows suit. During the Liturgy of the Word, the priest gives a short greeting and the Penitential Rite commences. During this time, the congregation publicly acknowledges that they are sinners and have sinned in some capacity since the previous week. Next the Gloria is prayed to give praise to God and an opening prayer is said. Scripture readings follow with a reading from the Old Testament, a psalm, a selection from the New Testament Epistles or Acts of the Apostles, and concluded with a gospel reading. The priest or deacon will deliver a homily incorporating the messages from scripture followed by prayers of the general intercession. The second half of the Mass is composed of the Liturgy of the Eucharist. The essential characteristic here is one of offering. The gifts of bread and wine are collected and prepared on the altar followed by a cleansing ritual of the washing of the priest's hands. Prayers of offering are said on behalf of the people by the priest and homage is paid to God. The Eucharistic Prayer begins next where the priest uses the same words that Christ used at the Last Supper, commanding his followers to eat his flesh and drink his blood as the new and everlasting covenant. Catholics refer to this as the Consecration—the point where a miracle occurs and the bread and wine are transformed into the literal body and blood of Jesus the Christ. Next the Our Father prayer is recited as well as a sign of peace exchanged among the faithful. The Lamb of God is said next prior to preparation for the distribution of Holy Communion. The Mass is closed by a final blessing with the command to go out into the world and spread the gospel of Christ.

The Church believes that the Mass is the highest and supreme form of prayer, so it contains all elements of Catholic prayer to include adoration (praising God), contrition (asking for God's forgiveness), petition (asking God for a favor), and thanksgiving (showing gratitude to God).

Catholics do have an obligation to attend and participate fully in Mass on Sundays (or during the vigil Mass on Saturday evening) as well as on Holy Days of Obligation in order to fulfill the Third Commandment to keep holy the Sabbath day. At the Mass, Catholics believe that the three levels of the Church converge and are united with one another, meaning the saints in heaven (church triumphant), the believers on earth (church militant), and the suffering souls in purgatory.

Sacramentals

Because God is the author of all created things, both spiritual and physical, Catholics attempt to directly connect to the spiritual world though worship utilizing all of the senses. In this manner, Catholics have developed many objects, tools, and techniques to draw the believer into a closer union with God. These are known as sacramentals. Holy water is a common example of a sacramental. All sacramentals give the recipient a special grace necessary to fulfill the mission of a particular sacrament. Holy water is used as a symbolic reminder of the sacrament of baptism.

Other sacramentals include actions, such as the sign of the cross. This is a common expression that is authentically Catholic because it draws one into a deeper union with the eternal. Catholics make the sign of the cross by using their right hand to touch it to their forehead, middle of the chest, their left shoulder, and then their right shoulder while saying, "In the name of the Father, and of the Son, and of the Holy Spirit, amen." The sign of the cross communicates, symbolically, two basic tenets of the faith: the Holy Trinity (Father, Son, and Holy Spirit) and humankind's salvation through the cross of Christ.

Genuflection is the act of touching one's right knee to the floor while bending with the left knee while making the sign of the cross. Catholics genuflect in front of the Holy Eucharist or the place where it resides because they believe it is truly the body, blood, soul, and divinity of Jesus and they want to show respect and acknowledgement of this true presence.

The crucifix is another authentically Catholic symbol. It consists of the wooden cross with a corpus of Jesus's crucified body mounted on it. The crucifix serves as a constant reminder of the ultimate price paid for humankind's sins (death on a cross) and inspires Catholics to turn away and repent of their sins

and be grateful for the salvation obtained by Jesus's passion, death, and resurrection.

The five senses of sight, touch, smell, sound, and taste are all used in Catholic worship to draw one into a more intimate relationship with the eternal. Because the internal action of divine grace entering the human soul cannot be actually experienced by the senses, Catholics believe in using external symbols perceived by the senses while the soul receives the divine grace. A genuine Catholic use of the visual surfaces in stained glass, great masterpieces in art, and church architecture are a few examples of how the visual senses are used to connect to the divine grace. Similarly, depending on the liturgical time of the year of the Church, priests and deacons wear different colored liturgical vestments, garments for worship at the Mass. These vestments also have symbols on them such as the cross, the first and last letters of the Greek alphabet (the alpha and omega) representing Jesus, who is the beginning and the end, or the letter M for Mary, the Mother of Jesus.

The sensation of touch is another of the senses that is used in Catholic worship to draw the faithful into a deeper communion with the spiritual. During baptism, one can feel the water being poured over oneself; during anointing of the sick, one can feel the oil of the sick being applied to their forehead and palms; and during confirmation, one can feel the bishop laying his hands on the head. Other areas where touch is highlighted during Catholic prayer is when praying the rosary. The beads are used to meditate on the mysteries of Jesus and Mary. Similarly, on Ash Wednesday, Catholics feel the burnt ashes being traced on their forehead in the sign of the cross. Holy water fonts are placed at the entrance of every Church for Catholics to make the sign of the cross upon entering to remind themselves of their baptism and that they are entering a holy place.

The sense of smell is articulated by burning incense to remind the faithful of the delightful aroma of the sweetness of God's divine mercy. Similarly, the chrism oil has a distinctive scent of balsam emanating from it and is used to consecrate bishops, anoint the hands of the priest, confirm Catholics, baptize Catholics, bless bells, and consecrate altars and churches.

Listening to the word of God through scripture readings at each Mass calls the auditory senses into use. The prayers of the priest and congregation are also considered important, so the congregation is asked to pay attention and respond at the appropriate time. Catholics use plenty of music generated by both the human voice and instruments as reminders of God.

The sense of taste is employed primarily during the celebration of the Mass when Catholics consume the body and blood of Jesus under the appearance of unleavened bread and grape wine. The central mystery and dogma of the Catholic faith is that the substances of bread and wine are really changed into the substances of the body and blood, soul and divinity of Christ by the priest when he says the words of consecration at Mass. Although the appearance of bread and wine remain, Catholics believe the substance has inherently been transformed to enable them to literally eat his body and drink his blood.

The seven sacraments of the Catholic Church stem from a developmental perspective. There are three sacraments of initiation (baptism, Holy Eucharist, and confirmation) and four sacraments of community and mercy (marriage, holy orders, penance, and anointing of the sick). Baptism is usually conferred just after birth, Holy Eucharist at the age of reason (about age 7), and confirmation at the start of adolescence (around age 14). The Sacraments form the basis by which God communicates to His people.

Baptism is the sacrament of initiation into the family of God by which one is adopted. During baptism, original sin (the sin of the original parents of the human race) is washed away and the person is made new in Christ. Likewise, sanctifying grace is also conferred during baptism. Sanctifying grace includes the forgiveness of sins, birth into the new life by which man becomes an adoptive son of the Father, a member of Christ, and a temple of the Holy Spirit. Baptism also imprints on the soul an indelible spiritual mark that marks the baptized for Christian worship. For this reason, baptism cannot be repeated nor does the Church believe there is need to repeat it. Typically, water is poured over the child's head and while saying, "I baptize you in the name of the Father, the Son, and the Holy Spirit."

Following a developmental perspective, the next sacrament to be received by the faithful is the sacrament of penance. Three actions by the penitent and the absolution by the priest comprise this sacrament. The penitent's actions include sincere repentance, honest disclosure of the sins to the priest, and the valid intention to make and do works of reparation. The priest then offers a penance or performance of certain actions of satisfaction to the penitent to repair the harm caused by sin and to reestablish suitable Christian practices. Because individual sin affects all of mankind, the Catholic Church extends the need to

confess one's sins to all of mankind. The priest represents society during the sacrament as well as Christ and maintains the power to forgive all transgressions confessed. This power to forgive sins can be traced to Jesus conferring this upon his apostles in John 20:22–23 when he stated, "Receive the Holy Spirit. Whose sins you forgive are forgiven them, and whose sins you retain are retained."

Only after the sacrament of penance is experienced for the first time are the faithful able to receive the sacrament of Holy Eucharist. During this sacrament of initiation, children receive the body and blood of Christ. This sacrament is the most central and critical to Catholicism because of the belief that the consecrated bread and wine are truly and substantially the body, blood, soul, and divinity of Christ. This act of consecration is known as transubstantiation. Holy Eucharist is the only sacrament that can be received repeatedly by the faithful because it is celebrated at each Mass during the Eucharistic Prayer. Because Catholics believe that Holy Eucharist is truly the body, blood, soul, and divinity of Christ, they have strict laws permitting only those who are in communion with the Church to receive the Eucharist. Thus, by taking Holy Communion, one is expressing union with all Catholics around the world in faith, life, and worship of the community. For Christians not fully united with the Catholic faith to receive Holy Eucharist would imply a oneness which does not exist in beliefs on doctrines, laws, and obedience to leadership.

The final sacrament of initiation is known as confirmation. Throughout the believers' entire faith life, the Catholic is growing and being nurtured spiritually. At confirmation, the adolescent makes a conscience decision to enter deeper into a mature relationship with God, and the Holy Spirit is invoked to descend upon the person as at Pentecost, when the Holy Spirit descended on the Apostles and Mary in the upper room in Jerusalem, infusing them with confidence and courage to go and spread the Gospel. Confirmation builds on what was initiated at baptism and nurtured through Holy Eucharist. Catholics view confirmation as the spiritual equivalent to the natural growth process. Sometimes confirmation is referred to as the process of making soldiers of Christ and signifies a spiritual maturing into a young adult, ready to go out and defend the faith. The 12 fruits of the Holy Spirit are invoked at confirmation and include charity, joy, peace, patience, benignity, long-suffering, mildness, faith, modesty, continency, and chastity. The Holy Spirit also delivers supernatural graces to the soul. These graces are referred to as the seven gifts and are wisdom, understanding, counsel, fortitude, knowledge, piety, and fear of the Lord.

As the young adult progresses into adulthood, the sacraments of community become more relevant and serve as the basis for social development. They include matrimony and holy orders, and both are considered to be vocations in the Catholic faith.

The sacrament of matrimony is considered a sacred covenant between the husband and wife and Christ. It also signifies the union of Christ and the Church. Because it is a sacrament, it imparts grace on the couple to love each other in the same way that Christ loved his Church, strengthens their indissoluble unity, and sanctifies them in preparation for eternal life. The three components necessary for a valid marriage include a permanent unity unto death, faithfulness in the marriage, and an openness to the possibility of children. The sacrament of matrimony is different from the legal state of marriage, which is regulated by civil authorities. In this regard, Church annulments are also different than the legal proceeding of a divorce, and annulments have no bearing on the legitimacy of the children. Annulments declare the marriage as null and void, meaning it never took place in the first place, because it was entered into invalidly, by factors affecting them either unknowingly or unintentionally, by the parties.

The sacrament of holy orders, another vocation in the Church, is the process by which deacons, priests, and bishops are formed. These sacred ministers serve the spiritual needs of the greater Church, and thus this sacrament creates the hierarchical structure associated with the Catholic faith. St. Ignatius of Antioch claimed that without the three degrees of the ordained ministry, one cannot speak of the Church. This hierarchy also confers a certain sense of dignity and respect indicative of the sacraments these ministers confer. Holy Orders are conferred by the laying on of hands followed by a solemn prayer of consecration asking God to grant the ordained the graces of the Holy Spirit required for his ministry. A permanent sacramental mark is imprinted on the soul of the priest during this sacrament. Only baptized men can receive this permanent mark in the sacrament of Holy Orders because of the natural property of the sacrament. Because God endowed things with definite natures to fulfill certain purposes, it does matter to God what things are used as means to ends. Henceforth to Catholics, matter matters. Therefore, because of the unchanging nature and element of the sacrament being conferred, neither popes, councils, nor bishops can change it. This is similar to the use of water in baptism

and bread and wine for Holy Eucharist. The three reasons noted by the Catholic Church for why women are unable to be ordained into Holy Orders include (1) the valid matter or material necessary for any of the seven sacraments cannot be changed by the Church, (2) there is a sacred tradition of 2,000 years that has never had an instance of female priests, and (3) Christ only called men to be apostles, even to the point of excluding his mother. Each degree of holy orders can only be received once, but each lower degree is necessary before moving on to the next level, meaning that the order of ordination is first as a deacon, then as a priest, and finally as a bishop. Only bishops have the ability to administer all seven of the sacraments, while priests can celebrate five (baptism, penance, Holy Eucharist [Mass], matrimony, and anointing of the sick), and deacons can celebrate two (baptism and matrimony, assuming that the matrimony does not include a Mass).

Finally the sacrament of the anointing of the sick is delivered as the final and last sacrament that a person can receive and often has been referred to as extreme unction or last anointing. In centuries past, this sacrament arrived at the close of the life span in a typically developing Catholic, void of a premature death. Anointing of the sick is the other sacrament of mercy along with penance. The primary purpose of anointing of the sick is to offer prayers for potential recovery from illness, but also to strengthen the soul of the sick person. An additional benefit of the sacrament is that it absolves all sins the person is sorry for but may not have had a chance to confess in the sacrament of penance. Oil of the sick is used as a sincere sign of spiritual assistance during this sacrament and administers to the senses of touch, sense, and sight. Like Holy Eucharist, Catholics can receive this sacrament more than once. Redemptive suffering, or the uniting of one's suffering to that of Christ's, is believed to provide a person with meaning and purpose and is highly emphasized through the sacrament of the anointing of the sick.

To continue to remain in good communion with the Church, Catholics must be free of mortal (grave sin cutting one off from the grace of God) sin, attend Mass on all Sundays and holy days of obligation, receive the Holy Eucharist during the Easter season, confess sins at least once a year, fast and abstain from meat on appointed days, observe the marriage laws of the Church, and contribute to the support of the Church.

—Richard W. Puddy and Michael C. Roberts

See also Religion

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CENTERS FOR DISEASE CONTROL

The Centers for Disease Control and Prevention (CDC) is an agency of the Department of Health and Human Services responsible for developing and implementing disease prevention and control, environmental health, and health promotion and education aimed at enhancing the health of people in the United States. The CDC started in 1946, and since then, it has become the chief federal agency for protecting the health and safety of people, offering reliable information to improve decisions about health, and promoting health by forming sound partnerships. The CDC's mission is "to promote health and quality of life by preventing and controlling disease, injury, and disability." Part of this mission includes protecting people from some of the most prevalent, deadly, and baffling threats to personal health. CDC employees often travel to investigate and try to control infectious diseases that threaten individuals, communities, and nations.

The agency has formed national and international partnerships in order to develop prevention strategies, encourage healthy behaviors, identify and explore health problems, conduct research, foster safe environments, and impart leadership and training. The CDC also assists state and local departments with tasks such as ameliorating environmental hazards, identifying illnesses, educating the public on sexually transmitted diseases, stressing the importance of immunizations for children, and other community undertakings. In addition, the agency values relations with private corporations and media outlets that team up to promote public safety and health.

One goal of the CDC is to continually provide significant, accessible, up-to-date information that is necessary public knowledge. As listed on the official CDC Web site, the agency has set goals to conquer future challenges as well. Some of the current and future challenges for the CDC include putting science into action, preventing violence and unintentional injury, meeting the health and safety needs of a changing workforce, employing new technologies to provide credible health information, protecting individuals against up-and-coming infectious diseases, eliminating racial and ethnic disparities, fostering safe and healthy environments, and cooperating with partners to advance global health.

The CDC includes 12 centers, institutes, and offices that specialize in certain aspects of health. The Office of the Director (CDC/OD) manages and oversees the activities of the CDC. The National Center for Infectious Diseases (NCID) prevents illness, disability, and death that result from national and global infectious diseases. The CDC also has a national center that specifically targets preventing and controlling human immunodeficiency virus, sexually transmitted diseases, and tuberculosis—the National Center for HIV, STD, and TB Prevention (NCHSTP). The National Center on Birth Defects and Developmental Disabilities (NCBDDD) leads the country in preventing birth defects and developmental disabilities and also focuses on enhancing the wellness of people with disabilities. The National Immunization Program (NIP) prevents disease, disability, and death caused by vaccine-preventable diseases. The National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) prevents untimely death and disability from chronic diseases and encourages healthful personal behaviors. The National Center for Environmental Health (NCEH) promotes prevention of disease and death that occur as consequences of interactions between people and environments. The Epidemiology Program Office (EPO) works on advancing the public health system through coordination, support, and training. The Public Health Practice Program Office (PHHPO) fortifies community practice of public health. The National Center for Health Statistics (NCHS) offers statistical information that helps determine what actions to take and policies to put in place to improve the health of Americans. The National Center for Injury Prevention and Control (NCIP) prevents death and disability from both unintentional and violent injuries. The National Institute for Occupational Safety and Health (NIOSH) fosters safety and health for people in the workplace.

The CDC's official Web site provides general information about the agency, national and state data and statistics, and CDC publications.

—Kristin L. Rasmussen

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Centers for Disease Control and Prevention, http://www.cdc.gov

CHARTER SCHOOLS

Charter schools represent a relatively new school reform strategy in the United States for children in kindergarten through 12th grade (K–12). Starting with the passage of the first charter school law by the legislature of Minnesota in 1991, the number of states with charter school legislation has grown to 41 states and the District of Columbia. At the beginning of the 2004 school year, there were approximately 3,000 charter schools with an estimated enrollment of more than 650,000 K–12 children.

What are charter schools and why were they created? A charter school is a publicly funded school operating under a charter or contract granted by a state or a local education agency such as a school board, public university, or state board of education. Charters may be entirely new or conversions of existing public schools. The charter determines the operating provisions for the school, including funding, performance objectives, mission, and student population. Because charters operate as public schools and are users of public funds, they must be nonsectarian. They may recruit students from a particular geographic area or

for a specific academic theme, although they must take all applicants. If demand exceeds available space, students are admitted by lottery. As schools, charters tend to have smaller enrollments than traditional public schools and are found in a variety of grade-level configurations from kindergarten through high school.

When considering charter schools, it is important to identify the state in which the charter operates because charter school laws differ significantly from state to state. Some states, such as Arizona and California, have more than 500 charter schools. In these instances, the state laws are very favorable and encouraging to charters, while other states have more restrictive laws. Rhode Island, Tennessee, and Virginia, for example, each have fewer than 10 schools. As of January 2005, 10 states were without charter school legislation.

Contracts to operate charter schools are granted for anywhere from 3 to 10 years depending on the state law. As public schools, charters must address state curricular frameworks and meet state testing requirements. They also are responsible for the mandates imposed by the federal legislation, P.L. 107–110, known as the No Child Left Behind Act enacted by Congress in 2000. Charters receive support from many political groups and national organizations. Both former President Clinton and President George W. Bush have actively supported the concept and have approved federal expenditures to provide technical assistance to these schools.

In general, charter school laws embody several important school reform theories. The first is that parents should be given greater opportunity and voice to choose among a variety of options for the education of their children. Parents, it is believed, will know what is best for their children. Second, by granting charter schools greater autonomy and freedom from existing bureaucratic requirements, charters will be liberated to become more creative and innovative in their ability to deliver effective educational services. A third view is that charters will introduce a desired market-like environment into public education, causing traditional and charter schools to compete for students. Through this competition, it is argued, poorly performing schools will lose customers and be driven out of business. These theories embody what is often called a basic bargain, in which charters accept increased autonomy in exchange for greater accountability from the chartering agency. Should a charter fail to meet the conditions of its charter, it will be closed.

Charter schools are viewed contentiously in some quarters. Several organizations and individuals worry that charters are draining public dollars from public schools. When a child leaves a traditional public school to attend a charter school, money that would have gone to the traditional school to support the child is transferred to the charter school. In another area, opponents and supporters argue about the academic success of these schools. Several recent studies report conflicting answers on this question. In the end, far more research and investigation of charter schools will be necessary to determine whether these schools represent a viable reform strategy for the improvement of K–12 education.

—Katherine K. Merseth

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CHILD ABUSE

Child abuse is a global problem. The World Health Organization (WHO) estimates that 40 million children between birth and 14 years of age are abused or neglected annually around the world. Thus, child abuse is found across all societies and cultures, almost always surrounded by secrecy and denial. The exact number of children who are abused is not known due to underrecognition and underreporting. Children are often too young to understand or to communicate what is happening. Moreover, because abuse is often perpetrated by parents or caregivers, even when children understand that they are being abused, they often feel loyalty, dependency, and emotional ties to the perpetrator, which keep them from reporting the abuse. In the United States alone, an estimated 879,000 children suffered from abuse and neglect in 2000. In 2001, about 2,475 children were abused daily, and more than 50,000 reports of possible child abuse and neglect were reported to child protective services.

HISTORICAL AND CULTURAL PERSPECTIVE

Cultural differences in attitudes toward child rights, child labor, and corporal punishment (physical

discipline of a child such as spanking, beating, and whipping) contribute to wide cultural differences about what is considered abusive toward children. Wealthy industrialized, technology-based nations hold different perspectives. By such nations' standards, the living conditions, quality, and/or lack of water, food, and shelter for children in developing nations is commensurate with child maltreatment. In some developing nations, cultural rituals involve mutilation of children's genitals (often females only), while male children are sent off to war. The conceptualization of what is child abuse and maltreatment is subject to wide cultural variation.

In the United States, belief in a child's right to humane treatment and adequate care evolved from an initial perspective that children were possessions to be treated as their parents or caregivers saw fit. For example, the Massachusetts Stubborn Child Act of 1654 permitted parents to put stubborn children to death for noncompliance. Throughout the colonial United States, children were virtually enslaved as apprentices or otherwise engaged in hard labor for barely enough money to pay for their own food. In 1870, the Census Bureau reported that one of every eight children was employed. By 1900, the figure had dropped to one in six. Abandoned, runaway, or maltreated children were also sent "out West" as laborers. Child abuse and maltreatment gained focus in 1874 with the case of Mary Ellen Wilson, a child of somewhere between 8 and 10 years of age, who was severely abused by her stepmother. Concerned citizens turned to the Society for the Prevention of Cruelty to Animals because at that time there were no formal organizations to help abused children. This incident led to the birth of child protection groups, and represented a growing shift in the public's perception on the treatment of children. As a result of the Mary Ellen case, the Society for the Prevention of Cruelty to Children was established in New York in 1875, pioneering the development of other advocacy and protective organizations for children across the United States.

WHAT IS CHILD ABUSE?

Federal legislation provides the basis for the definition of child abuse in the United States, although each state has its own statutes as well. In 2003, the Federal Child Abuse Prevention and Treatment Act (CAPTA) was amended by the Keeping Children and Families Safe Act to define child abuse as "any recent act or failure to act on the part of a parent or caretaker which results in death, serious physical or emotional harm, sexual abuse or exploitation." A "child" is typically defined as any person under the age of 18 years, although for some state definitions of sexual abuse, the definition of the age of a child is specified otherwise.

Child abuse includes acts of commission or acting upon a child. Mental health professionals typically question any actions by caregivers that result in marks, swelling, bruises, burns, or breaks to the child's skin; obviously even more severe injuries such as bone fractures or internal injuries are considered abusive. Falling within the acts of commission are sexual abuse and exploitation.

Child abuse also includes acts of omission or neglect that involve failure or lack of action by the parent or other caregiver to protect or care for the child. Such acts of omission include, but are not limited to, failure to provide adequately for the child's basic physiological needs such as food, water, clothing, and shelter; failure to provide adequate supervision from harm or failure to tend to a child's medical needs. There are exceptions to what is considered an abusive act of omission. U.S. state statutes often exempt parents who do not obtain medical intervention for their children due to religious beliefs. Cultural values/practices and poverty also cause wide differences in the standards of care set by parents and caregivers across cultures.

TYPES OF CHILD ABUSE AND NEGLECT

Child maltreatment is a general term used to encompass all types of child abuse and neglect, including physical abuse, neglect, emotional abuse, sexual abuse, and exploitation. Neglect is the most common type of maltreatment, making up about 62.8% of known victims in 2000, followed by 19.3% being physical abuse cases, 10.1% sexual abuse, and 7.7% emotional abuse and neglect.

Physical Abuse

Physical abuse involves causing bodily injury to a child, including but not limited to hitting, punching, kicking, burning, beating, or shaking. Such actions are considered physically abusive whether or not the parent or caregiver intended to inflict injury. Physical abuse can be deliberate or can be the result of excessive corporal punishment.

Shaken baby syndrome, known medically also as whiplash-shaken infant syndrome, involves injury caused to an infant by shaking a baby by the arms, legs, shoulders, or chest. As a result of the shaking, the infant's head is forced forward and backward, causing the brain to collide with the inside skull. Severe brain injury and death may result. Even mild shaking of an infant can lead to injury or death. The estimated number of cases of shaken baby syndrome is between 600 and 1,400 annually in the United States, although this number may be too low due to underdiagnosis or underreporting of incidents. Babies cannot talk to explain what happened, and parents/caregivers do not readily admit to such conduct.

Munchausen's syndrome by proxy, also called factitious disorder by proxy, is a psychological disorder in which a parent, almost always a mother, lies about their child having physical symptoms or actually deliberately induces physical symptoms, for example, through poisoning or suffocation. The parent does so in order assume the role of concerned parent and to receive attention from the medical community. Such parents are deliberately fabricating or inducing their child's illness for their own psychological/emotional reasons, rather than for financial or material gain (such as disability income.) An estimated 400 to 500 cases are diagnosed annually, although certainly others go undetected.

Child Neglect

Child neglect can be physical, educational, or emotional. It involves acts of omission. In addition to physical neglect such as the failure to provide for the child's basic needs (such as food and shelter), educational neglect involves allowing a child not to attend school or willfully disregarding a child's special educational needs. Emotional neglect can be the most difficult form of neglect to detect. It involves failure to provide basic levels of nurturing to the child such as verbal or physical affection. Emotional neglect can also involve violence toward a parent in the presence of the child or condoning the child's use of alcohol and drugs.

Emotional Abuse

Emotional abuse moves from acts of omission to also include acts of commission that result in emotional injury or trauma to the child and/or serious behavioral or mental disorders. Emotional abuse may involve use of extreme punishments beyond what a reasonable adult would consider appropriate such as locking a child in a dark closet or less florid acts such as repeated scorning and verbally degrading the child, habitual scapegoating (blaming the child for causing any and all problems or stressors in a family), or rejecting the child. This form of neglect is the most difficult to detect because the harm is not physical.

Sexual Abuse and Exploitation

Sexual abuse and exploitation involve any inappropriate sexual behavior toward the child such as touching a child's genitals, sexual or anal intercourse, incest, rape, oral sex acts performed on the child, or forcing the child to perform them. It also includes forcing the child to watch sexual acts performed by others, exposing a child to sexual material or behaviors, or exposing or otherwise exhibiting one's genitals to the child. Sexual exploitation of children for financial gain involves child prostitution and production of child pornography. Whether the child is physically raped or otherwise touched against his or her will, or, more commonly, when the child is bribed, persuaded, tricked, coerced, or seduced, the activity is considered sexual abuse.

When the sexual abuse is occurring inside the family by an immediate family member such as the child's parent, it is referred to as incest. Unlike physical abuse and neglect, sexual abuse is much more premeditated and planned by the perpetrator. When a child is victimized by either a person in or outside of the family, there are steps that these perpetrators take in order to gain and maintain access to a child. This process is frequently referred to as grooming a child for abuse. Perpetrators of sexual abuse will often try to create a special trust or bond with the child. They strive to convince the child that they are a special or unique friend, and may do so by confiding in the victim or telling the victim of their loneliness and that the child can help. The perpetrator will also give the child gifts or special privileges. Next the pedophile attempts to alienate the child. Alienation is easier to accomplish when the sexual abuse occurs within a family. The child is alienated from the mother and siblings because of special privileges or status afforded by the perpetrator. As the abuser dominates the life of the victim, access to friends, support, and sources of help are minimized, creating dependency on the perpetrator. Next, secrecy is emphasized. The child is either directly

instructed not to tell anyone about the abuse, or the perpetrator is more subtle and convincing about the need for secrecy. The process of committing the actual sexual abuse typically involves progressive boundary violations. For example, first the perpetrator will simply be where they do not belong such as in the child's bed or in the bathroom with the child. Such boundary violations progress to inappropriate touching of the child and so on. The sexual abuse expands from inappropriate looks, conversation, and touching to more and more intense abuse. Specifically, a child abuse accommodation syndrome (CAAS) has been identified among girls who have been repeatedly sexually abused by a male perpetrator over time. This syndrome involves stages of secrecy; helplessness; entrapment and accommodation; delayed, conflicted, and unconvincing disclosure; and retraction. The common experience of the victims recognized by the CAAS include the ideas that sexual abuse is almost always shrouded in secrecy and feelings of helplessness in the victim; fear and ambivalent feelings (especially toward a perpetrator who is a family member) cause victims to disclose abuse in delayed and unconvincing ways and often to recant their disclosure later; and it is common for sexually abused children to show little emotion about the abuse and to delay for long periods of time before disclosing the abuse.

VICTIMS

Male and female children are about equally likely to experience neglect and physical abuse. Girls are almost five times more likely than boys to be sexually abused. Boys are more likely to be sexually abused by male nonfamily members such as teachers or coaches, whereas girls are more likely to be sexually abused by male family members. Thus, girls and boys have different patterns of vulnerability that should be taken into account for prevention purposes.

No group of children is immune from child abuse, and children of all ages experience abuse. Younger children from birth to 3 years old have the highest rates of victimization; they comprise the largest number of neglect cases (which is the most common form of abuse.) It is theorized that abuse rates drop with older children who are better able to understand what is happening and to disclose the abuse to others. One exception to the decline in abuse rates with age occurs with sexual abuse. The median age for female sexual abuse victims is 11 years and for males it is 8 years. Half of all victims of abuse or neglect are white, 24.7% are African American, about 14.2% are Hispanic. American Indian/Alaskan Natives make up 1.6% of victims, and Asian/Pacific Islanders account for 1.4% of victims.

Signs of Abuse

A child may show signs of being abused, including nervousness around adults; avoidance or fear of going home; low self-esteem; aggressive or sexual themes in their art, play, or interactions with others; developmentally inappropriate knowledge of or interest in sex; frequent physical injuries; and poor hygiene and grooming. Having many psychosomatic complaints (such as headaches, stomachaches) and difficulty sleeping, especially nightmares, is also common but in no way unique to abuse.

For physical abuse, injuries that are in the shape of a specific object (such as a belt buckle or a handprint) are suspect, as is a discrepancy between the parent's and the child's accounts of how the injury occurred. For sexual abuse specifically, genital or rectal pain, redness, itching, swelling, and sexually transmitted diseases are all strong indicators of possible sexual abuse. Regressive behavior and the occurrence of accidents after being solidly potty trained frequently signals the onset of some stressor strongly impacting a child.

Fatalities

The most tragic result of child maltreatment is the death of a child. Annually in the United States, an estimated 1,300 child deaths result from abuse and/or neglect. Fatalities are composed primarily of very young children, with more than 84% being less than 6 years old. The most common age of death is infancy (birth to younger than 1 year), which makes up more than 40% of the fatalities. Fifty-six percent of the deaths are male children, with the remaining 44% female. Neglect and/or the combination of both neglect and physical abuse cause almost all of the fatalities. For 82.8% of the total fatalities occurring annually, the abuse/neglect is perpetrated by one or both parents. Only a small percentage occurs when the child is in an out-of-home placement such as a foster home, group home, or residential treatment setting, although it is not rare for children to be abused and maltreated in such settings.

PERPETRATORS

Physical Abuse and Neglect

Maltreatment is linked with poverty and economic disadvantage. Conditions associated with lower socioeconomic status such as limited child care options, crowded and substandard housing, and limited access to adequate health care provide the backdrop for maltreatment. Parents account for more than 78% of all abuse or neglect cases, which is not surprising in that they are the primary caretakers of children. Parents who are physically abusive or neglectful often come from homes in which they also were abused and neglected. This is part of a multigenerational cycle of abuse. Therefore, these parents lack successful, positive parenting role models. On average, most abusive parents are young—in their 20s—near or below poverty level, lack high school education, and have been victims of childhood abuse themselves. These parents lack economic resources and social support and have inadequate coping skills. They are isolated, perhaps living away from or estranged from family and friends. However, it is important to remember that no profile fits all abusers, and abuse permeates across gender, all races/ethnicities, and all social classes. Abusive and neglectful parents generally interact less with their children. They often appear uninvolved or uninterested in the care and well-being of their children. They may also appear overly critical of their children and very rigid about discipline. A major risk factor for violence in any home is active substance abuse by a parent. Forty percent of known cases of child abuse and neglect involve substance abuse.

Physical abuse can be triggered by stresses related or unrelated to the child. Stressors related to the child include excessive crying, such as with a young child or an infant with colic, feeding or potty training challenges, unrealistic expectations of a child, and holding highly exaggerated perceptions of the child's disobedience. Stresses unrelated to the child include economic, housing, or personal problems, loss of a job or a loved one, physical or mental illness of the parent or caregiver, and legal difficulties. In addition to active substance abuse in the home, another major risk factor for child abuse is domestic violence. Children who live in homes where a male caregiver is physically abusive to another adult in the home are at severe risk for being victims of physical abuse as well.

Sexual Abuse

Perpetrators of sexual abuse are also referred to as child molesters or pedophiles. Sexual abuse is perpetrated more than 90% of the time by males. The vast majority of cases are committed by someone who is known to the child, and as much as 80% of these cases involve a family member such as a father, stepfather, or uncle. Moreover, the child who is sexually abused by a family member is likely to experience repeated and more severe levels of abuse than those children abused by nonfamily perpetrators. As a result of the repetitive and severe nature of the abuse as well as the emotional betrayal of the adult family member who perpetrates the abuse, these cases also tend to result in more serious psychological damage and consequences for the child.

Perpetrators of sexual abuse often have deviant sexual arousal patterns that emerged in adolescence. Many of them have specific gender and/or age preferences for victims. Other than the large majority of sexual abusers being male, no other characteristics such as personality traits, occupation, or age can be used to predict who is an abuser.

CONSEQUENCES OF ABUSE

Short-Term Consequences

Child abuse and neglect do not affect all children in the same way. The impact of the abuse on the child depends on the nature, severity, and length of time over which the abuse occurred, as well as the child's temperament, personality, and level of functioning prior to the onset of the abuse. The level of emotional support and assistance received by the victim is also critical. Whether the child has just one positive, consistent, and nurturing relationship with a person in his or her life has been shown to significantly mediate or protect the child from the potential effects of the abuse.

Abuse can seriously interfere with a child's normal development, resulting in emotional and behavioral symptoms in the child. Chronic, repeated abuse, especially by a parent, may interfere with a child's ability to formulate an attachment or bond with a parent. Later, these children have difficulty establishing healthy, reciprocal emotional connections with others.

Children who are abused or neglected also tend to have difficulty coping with their own emotions. They are likely to have inhibited emotional expression and

may engage in unusual, maladaptive, and self-injurious behaviors, such as cutting themselves or abusing substances. Children who are abused are at severe risk for developing a wide array of psychological disorders. Girls who have been abused tend to develop more shame, self-blame, and internalizing disorders such as anxiety and mood disorders. Boys tend to show more problems associated with acting-out behavior such as physical and verbal aggression and defiance and the development of conduct disorders. These girls and boys lack self-esteem and positive beliefs about themselves and their world. Frequently they feel like they are unworthy of love and blame themselves for the abuse.

In general, maltreated children evidence one of two patterns in their peer relationships. The first pattern is one of hostility. Abused children, especially in the case of physical abuse, tend to interpret ambiguous or even friendly behaviors as hostile or threatening. They are more physically and verbally aggressive toward others and tend to have limited social networks, with aggressive and attention-seeking behaviors. The second pattern, associated with neglect, involves withdrawal and avoidance of peers. Such children are withdrawn, passive, and therefore as socially isolated as the children who display the aggressive pattern.

Abuse interferes with a child accomplishing what is developmentally expected of them, including impairing academic achievement. It is common for abused children to have poor grades. A dramatic drop in grades can be a strong indicator of the onset of some significant stressor in a child's life.

Long-Term Consequences

Not all abused or neglected children develop psychopathology that can follow them throughout adulthood. Yet, all are at increased risk for doing so. The negative outcomes stemming from abuse can be avoided if children receive social support from nonoffending family members in addition to other intervention. However, without such support and the opportunity to develop healthy coping and interpersonal skills as well as a renewed ability to trust others who are worthy, these children are at tremendous risk for developing mood disorders (such as clinical depression and even suicidal behavior), posttraumatic stress disorders and other anxiety disorders, dissociative disorders, sexual adjustment problems in adulthood, and criminal and antisocial behavior.

TREATMENT

Parents and caregivers most in need of treatment because they are perpetrating child abuse are actually the least likely to seek it. Child abusers may feel shame and guilt and fear losing their children. Abusers who are non–family members fear criminal repercussions. Most often, treatment only comes as the result of legal mandate once the abuse is discovered.

Since the 1960s in the United States, a protective, social work approach to child maltreatment has been the prevailing standard. Currently all 50 states and the District of Columbia have mandatory reporting laws that require professionals and other individuals who work or interact with children to report suspected abuse to child protective service (CPS) agencies. False and malicious reporting occurs and is highly problematic.

Many CPS agencies have child protection teams (CPTs). These are multidisciplinary teams that are called into action immediately when a reasonable suspicion of child abuse has come to light. The CPT includes pediatricians who are trained in the medical examination of a possible victim and mental health clinicians who are trained in how to conduct forensic interviews to address the possibility of abuse. Clinical social workers and clinical psychologists on the team coordinate evaluation of parents, treatment planning for the perpetrators and victims, and referrals for all necessary services.

The prevailing philosophical emphasis related to the mandatory reporting legislation and child protective services for within-family abusers is family preservation (maintaining a child in the home rather than removal whenever possible), which is considered to be in the best interests of most abused children (except in extreme, horrific, or treatment-resistant cases) as well as cost effective compared with out-of-home placement of children in foster care, group homes, or other residential settings. More evaluation and research on the outcome of these programs is needed in order to determine their effectiveness in rehabilitation of the abuser and treatment effectiveness with the abused children.

In the United States, family preservation programs are modeled after the Washington State Homebuilders Program. These programs provide individualized treatment plans for each family. Treating abusive or neglectful parents frequently involves counseling multiproblem, complicated families. Counseling interventions are intensive and frequently referred to as "wraparound" services. Treatment for the abusers commonly involves

individual and group counseling, including strong parent education and counseling in relaxation training, stress and anger management skills, cognitive restructuring to assist the parent in interpreting and responding to the child's behavior more appropriately, problem-solving skills, and training in basic child-rearing skills. Parents are provided with exposure to positive parenting models and skills and may practice them through role playing and coaching from a clinician. Abusive parents may also need intensive substance abuse/dependency intervention, assistance with job training, and other social and financial assistance. Neglectful parents also frequently require training in how to manage everyday demands of living such as money management and housekeeping. Neglectful parents need to break a cycle of avoidance of interaction with their children and of daily responsibilities, replacing this with positive parent-child interactions and active care for their children and daily life responsibilities.

Treatment for the victims of abuse is also important. For children who have been physically abused, play therapy, individual therapy, group therapy with other children, and on-site therapeutic interventions at the child's school, day care, and home focus on rebuilding the child's battered self-esteem and self-concept. Related goals include restoring the child's sense of self-efficacy (sense of power or ability to have some control over themselves and their environment) and improving the child's social behavior, cognitive development, and academic achievement.

For sexually abused children, treatment is aimed at helping the child realize that what they experienced was abuse, that it was wrong, and that it was not their fault. These children need to slowly, in a paced manner and safe environment, share and release their memories and feelings about the trauma in order to prevent or extinguish posttraumatic-stress-related symptoms and alleviate guilt, shame, and self-blame. As is the case with physical abuse, rebuilding the child's self-esteem is an important therapeutic goal, as is helping the child to regain a sense of safety. Educating the child about sexual abuse and ways to prevent it from occurring ("I know I can tell my mommy if anyone tries to touch my private parts, or makes me feel uncomfortable") is important.

In relation to the treatment of sexual abusers, unfortunately the outcomes of treatment programs are poor, with very high recidivism rates. Thus, the criminal court systems tend to focus on incapacitation (removing access to victims) and retribution. Research into treatment options is expanding, as is the availability of prison treatment programs for pedophiles, despite limited treatment success at this time.

PREVENTION

In the area of prevention of child abuse, prevention can occur at the cultural level. Cultural violence, as evidenced by strong violence in the media, has been linked as a promoter of violence within families. On a cultural level as well, the link between poverty and child abuse has been established. Thus, efforts to reduce cultural violence and poverty are theorized to have a direct impact on the welfare of children.

Breaking the multigenerational cycle of violence is a direct way to prevent future child abuse. Because many abusers were abused themselves, these individuals need specific intervention before or while being parents in order to prevent the cycle from perpetuating. Because substance abuse is also so strongly linked with child abuse, substance abuse prevention and intervention with parents is another way to prevent child abuse.

Prevention and education services aimed directly at future parents have a strong impact as well. Prenatal medical care protects the health of the new mother and allows her to be in a better state to care for a baby. Prenatal programs, family-centered birthing and coaching classes, infant care classes, and parenting classes do everything possible to educate and prepare parents for the demands of caring for a baby, with the goal also of facilitating emotional bonding between the infant and the family. Careful attention by the medical profession and the members of a new mother's support system is recommended, so that postpartum psychological symptoms and disorders can be treated, preventing neglect and maltreatment of the infant, and alleviating the mother's intense suffering caused by these often unrecognized and untreated disorders.

Support groups, parenting education, and community programs can also assist in relieving parental stress. Food banks, shelters, thrift stores, and emergency assistance programs can provide some help to parents. Some communities even offer respite child care services where parents who are on the verge of abusive actions can leave their children temporarily. Schools provide safety education to children (programs on topics such as stranger danger) and teach children what to do if they are being abused. The National Child Abuse Hotline at 1-800-422-4453 is available for all members of the community.

SUMMARY

Despite increased preventative and intervention services and strong public awareness and concern about child abuse, this problem is far from going away. Only through continued education of parents and changes at all levels of society can the problem of child abuse be prevented and eliminated.

—Karen E. Mottarella

See also Battered Child Syndrome, Battered Woman Syndrome, Child Neglect

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CHILD CARE/DAY CARE

Quality child care/day care for families is an important aspect of daily life. At its best, child care provides positive socialization, enriches development, and improves social/familial/labor concerns. Child care/day care can simply be described as any service involving care of others' children, but child care is also complex in that it includes a variety of settings, activities, regulations, costs, quality, and types of providers. The three primary types of child care/day care are center-based care, in-home care, and family care.

Center-based child care outside the home is often referred to as day nursery, day care or child care center, nursery school, or *crèches* (French for "cribs"). These terms are often used interchangeably to identify various types of day care for children and for preschool educational programs. In most communities, religious institutions and civic groups also operate child care/day care and preschool facilities. Parents choose center-based child care because they believe that larger groups, multiple caregivers, and government inspections make programs safer for their children and make the arrangement more dependable. Parents respect the reputation of the child care program or the institution sponsoring the program. Many parents believe that more staff, space, equipment, toys, and organized activities provide a better learning environment for their children.

In-home child care is another type of child care, in which an outside caregiver comes into the family home and cares for the child. These caregivers are frequently referred to as nannies, babysitters, or *au pairs* (French: a young foreigner who lives with a family and does child care and light housework). Parents often choose and place trust in a provider based on recommendations from friends or professional services. With an in-home provider, parents believe that their children will be safer and more secure in their own home and that they will have more control over the kind of care their children will receive. Some parents find in-home care is a more convenient arrangement for the family and may provide more flexibility, as they can have all their children in the same location and may find that in-home care is not significantly more expensive than other forms of care.

Family child care is generally based in another person's home and may include children from several different families. Because they want to keep their children in a home-like environment, parents who use this kind of care consider themselves lucky to have a relative, friend, or neighbor to care for their children. Parents believe that these caregivers will provide warmer, more loving care for the child than an

institutional-type center and that the child will be more secure. Parents often prefer to relate to a single caregiver and believe that children are healthier, happier, and more secure in smaller groups. Many families choose family child care because they find it closer to home, less expensive, or more flexible. Many parents believe that relatives, friends, and neighbors will be more likely to share their values and thus feel more comfortable entrusting their children to them. Sometimes parents use this type of care because their schedules, budgets, or transportation problems limit other child care options.

While each of these types of child care/day care has many benefits and some detriments, the most important factor in choosing any child care is that parents feel comfortable leaving their children in a safe and quality care environment.

HISTORY

Child care as a cultural responsibility is as ancient as society itself. Historically, families enlisted the help of relatives or community members to care for small children much as they do today. Tribal, nomadic, and aboriginal cultures consider child care a primary and important function, where children are cared for during their youngest years by the entire group.

Modern child care services to young children and their families, while still paramount in importance, differ from the past in that they are more often provided outside the insular community.

Both the importance and the availability of outside day care increased in the late 19th and early 20th centuries due to the rising proportion of women working outside the home. Institutional child care appeared in France about 1840, and the Société des Crèches was acknowledged by the French government in 1869. Day care centers were established by the government in most European cities and industrial centers during the second half of the 19th century. Great Britain, for example, established the first centers in 1860, and in the United States, these institutions appeared by the 1920s.

By the early 1990s, women made up a significant portion of the workforce worldwide. In East Asia more than 60% of women were working, and in Western Europe and the United States, nearly 50% of women were employed. Without suitable child care arrangements, many of these women would be forced to stay home and forego working.

SOCIOPOLITICAL STRATEGIES

Successful child rearing is crucial to a healthy society. If children thrive in the earliest years, there is evidence that they become more valuable contributors to society. The pressure of providing quality child care is a universal challenge not only to the family, but to governments as well. To ameliorate these challenges, many developed countries provide infant care and preschool programs as policy. However, there is a good deal of variation across countries in the types of policies that governments use to support child care to families.

In Europe, child care is often provided by the state or by facilities licensed and subsidized by the state. For example, France and Italy include early child care in the regular public school system, Hungary has more than 3,000 state-operated day care facilities, and in Sweden, almost 60% of preschool children are enrolled in state-run child care institutions.

Countries such as Italy and Spain have low female employment rates and a low availability of child care. Countries such as Sweden, Denmark, and Finland have high female employment rates and provide wide access to child care facilities. In countries such as Germany and Austria, where child care services are moderately available, women are more likely to work part-time.

The United States is one of the few industrialized nations that does not have a comprehensive government-funded child care policy. In recent years, the federal government has passed legislation designed to help parents ease the burden of child care costs. This legislation includes allowing workers to set aside part of their income, tax free, to pay for child care; issuance of a child and dependent care tax credit; and state funding that can be used for day care facilities.

QUALITY, LICENSING, AND REGULATIONS

High-quality child care is the ideal for most societies. How a system achieves that ideal is through licensing and regulations. The goal of licensing is to ensure the safety and developmental well-being of children while in out-of-home care.

In the United States, many individual states follow the licensing curriculum developed by the National Association for Regulatory Administration. The curriculum was designed to ensure that all professionals and paraprofessionals serving infants, toddlers, and their families are adequately trained and provides a baseline of quality below which it is illegal to operate.

In most states, and in Europe, licensed child care/day care facilities require up-to-date immunizations for entrance. These immunizations help to prevent outbreaks of illness since children in child care/day care typically have more severe infectious illnesses than children cared for in the home. Reviewing and monitoring these facilities are essential to ensure compliance.

Current child care regulations are designed to protect children from harm and are key predictors of positive outcomes of both the children and the centers. Many states do not regulate care provided by relatives, friends, and neighbors. A few states require these informal providers to be screened through a criminal history check and/or child abuse and neglect clearance. Several states require minimal training in health and safety. Despite these efforts, unlicensed day care centers continue to operate.

There remains a need for regulations and licensing of child care services that meet the individual needs of children and of their parents. These regulations must be enforced with the goal of ever better outcomes for children and families.

RESEARCH

A great deal of research has been focused on the effects of care on children. There are numerous studies addressing social and emotional development of children in child care/day care settings. In general, it has been found that having young children in quality care environments is beneficial. Both language proficiency and cognitive function have been found to improve among children who attend day care centers.

Low child-to-staff ratios and staff education have been found to be major factors in positive outcomes in day care centers. Children in day care settings who had better educated teachers recorded higher measures of school readiness and language skills. In addition, Susanna Loeb, PhD, of Stanford University reports that children in day care centers scored better on a variety of tests compared with children who went to family child care homes or who were left with friends or relatives while their mothers worked.

FUTURE TRENDS

Child care is with us today and will continue to be with us throughout time. Most countries and world organizations are placing child care issues near the tops of their priority lists. The continued rise in population and, subsequently, women in the labor force are compelling countries to recognize the value of quality early child care. There is pressure on governments for new regulations, facility expansion, quality improvement, and affordable, universal access to child care for all families. The impetus for a better solution to child care needs will continue in all countries, despite variations in approach.

—Susan J. Moore Glenn

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CHILD CUSTODY

The term *child custody* employed here refers to child consequences and parental responsibilities following

separation and divorce. Child custody may also refer to legal terminology related to guardianship and legal authority in the care of a minor child following adoption, loss of parental rights due to abuse or neglect, or other situations. In each case, the concept of "in the best interest of the child" is often applied.

Child custody matters are a central concern among human development experts in the United States due to the high number of divorces. A great deal of research devoted to how custodial and guardianship matters impact child development and outcome have resulted.

Child custody is often determined after legal proceedings that may include a trial, civil mediation, or a hearing involving a state child welfare agency. Mental health experts assist in providing important information for the judge or hearing officer. Clinical social workers often complete a home study or investigation of the future possible home environment, as well as observations and opinions about the fitness and capability of the potential parents/guardians. Psychologists are also involved.

The American Psychological Association has specified the role of psychologists in child custody decisions. These guidelines direct psychologists to take the child's interests and needs into account as the primary determinant in recommendations to the legal system.

The typical child custody evaluation assesses the capacity of an adult desiring the responsibilities related to caring for a minor child. This is done by interviews, background checks, psychological tests, and structured observations of the adult and child in interaction. Evaluations may also include direct observation of the home environment.

Psychologists are then asked to make recommendations to the court regarding the best interest of the child. Psychologists should take into consideration key variables, including the child's developmental level, the level of functioning of the child, and a range of variables related to parental fitness in the adults. In addition, the fit or match between the adult(s) and child is also to be taken into account. The range of parental variables will include an assessment of parenting and discipline styles, consistency of behavior, and psychological qualities such as maturity level, freedom from psychopathology, and experience with children.

The psychologist provides expert testimony and opinion. Psychologists and other mental health specialists do not directly determine the final placement of a child—this is the responsibility of the judge or hearing officer.

Child custody issues after divorce are often related to new conflicts or disagreements. If old unresolved issues interfere, counseling is recommended. In addition, these three activities often help minimize conflict:

1. *Trying new ideas out on an experimental basis.* There arise legitimate disagreements over some issue for which there is no "right" way or solution. Families should try each proposed solution on an experimental basis in order to see what is best for their child. In the example of a dispute about overnight visits during the school week, one way to resolve the matter is to try both solutions for 1 month each and monitor the child's response in as fair a way as possible.

2. *Asking a trusted third party to help resolve your dispute.* When both parents believe that their position is best for the child, a third party can bring a fresh perspective. This individual should be a professional (a trusted therapist, counselor, or clergyperson). Such a competent third party will help both parents see what is best for their child.

3. *Attempting civil mediation to resolve disputes.* Many final divorce judgments include a mediation clause, requiring this alternative in an attempt to limit postdivorce caseloads, which overburden the family court system. It also encourages divorced parents to work out their problems between themselves, which leads to better, more personal solutions. Civil family mediation is intended to help parents reach a cooperative, mutually agreeable solution with assistance from a trained mediator. Much data suggest that families and children fare better when disputes are resolved through mediation because this settlement is family centered and individualized.

CHILD CUSTODY ARRANGEMENTS AND COPARENTING

Following divorce, a child may be placed in the sole custody of one parent or placed in a joint custody status. States have differing statutory guidelines for these decisions. In Florida, for example, minor children are to be placed in a joint custody arrangement, called shared parental responsibility (SPR), in all cases unless there is good reason to deny either person his or her parental rights and responsibilities. The Florida statutes say that it is the will of the people that children be raised by both parents in an arrangement termed coparenting. SPR is a court-ordered

relationship in which both parents retain full parental rights and responsibilities with respect to their child and in which both parents confer with each other so that major decisions affecting the welfare of the child will be determined jointly. In cases where one parent is determined to be unfit or unable to parent, or is a threat to the welfare of the child, then sole custody is awarded to the fit parent.

Coparenting is based on cooperation and respect between biological/adoptive parents, no matter their marital status, over the lifetime of their child. Coparenting involves (1) keeping the needs of children first and foremost no matter the feelings about the other parent; (2) working out plans that allow each child enough time to maintain and nurture relationships with both parents; (3) sharing responsibility and decision making for the children's care and needs; and (4) developing a means of communication that is straightforward, child centered, and problem resolving in the children's best interest.

The importance of coparenting has been documented in the social science literature. Children who have access to, and are influenced by, two caring involved parents fare best following separation and divorce. With appropriate coparenting, children have the minimum amount of later difficulties. When hostility and conflict interfere with coparenting, those children suffer the most. Level of involvement for each parent varies, but should be determined by the child's needs.

Coparenting is not always easily accomplished because bitterness, anger, and resentment from the divorce may interfere with successful child rearing. The child psychiatrist Richard Gardner has described and identified a pattern termed parental alienation syndrome (PAS). PAS is the opposite of coparenting and is defined as "a disturbance in which children are preoccupied with deprecation and criticism of a parent—denigration that is unjustified and/or exaggerated." PAS is a systematic process involving efforts by the "programming parent" which ultimately creates within the child (without further parental aid) an obsession to maintain his bond with the programming parent at the price of rejecting the other parent.

The hallmark symptom of PAS is the child's complete lack of ambivalence. The "hated" parent is all bad and the "loved" parent is all good and can do no wrong. One powerful way this plays out is when the alienating parent insists on taking a neutral stance, thus empowering the victimized child to make decisions about visitation. But with full knowledge that the alienating parent opposes the contact, the child refuses visits. Alienation also impacts the child, as when the child feels guilt during a required visit, leaving the programming parent abandoned.

There is some degree of alienating behavior between practically every divorcing parent dyad, which will eventually subside as the parties make their adjustments. It is when the alienation behavior is raised to a very high level, fueled by conflict and anger, that a child becomes endangered by his parents.

Coparents who are making their own positive adjustment will be more likely to be able to identify and respond to their child's needs following divorce. A successful child custody outcome is often dependent on the following four areas:

1. Children's remarks are often stated to elicit a response on two levels. A child complaining about being picked up late from school may also be worried by abandonment fears: "Will I be left alone like dad or mom?"

2. Once a child's concerns have been identified, parents must reassure their child. Making time to be with them without competing activities and seeking outside resources such as therapy, support groups for kids, and time with the school guidance counselor are essential.

3. Children can see that normalcy has returned by introducing new ways of doing family things like celebrations, holidays, and birthdays. In postdivorce situations, the child will need to adjust to alternating holidays and other events with different parts of their family. One should encourage children to come up with new ideas and traditions for the new family configuration.

4. The former in-laws remain relatives to your child after the divorce. Depending on how much contact was usual prior to the separation/divorce, that will be a predictor for what level of involvement is expected and needed by your child. If the child had regular and frequent contact with other relatives, there should be an honest attempt to keep that involvement alive. At all times, respect must be shown for all of the child's kin.

—Joseph D. Sclafani

See also Foster Care

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CHILD NEGLECT

There are many children in our society who go through the day without eating or who fail to receive adequate medical services when ill. Others reside in homes without running water or electricity or homes infested with rodents and roaches. At times, young children are left at home without adequate supervision and are often responsible for watching a younger sibling as well. The above scenarios are but a few examples of what is termed child neglect. Child neglect is defined by a broad spectrum of actions that can range from leaving a 5-year-old at home alone for the afternoon to a child not eating for days as her parents are strung out due to heavy drug use. Although child neglect is a serious social problem affecting our society, neglect is often viewed as unfortunate but benign and often goes unnoticed because it occurs in the privacy of a home. Similarly, the issue of child neglect has received limited attention in the research community, studied far less than physical or sexual abuse, despite the fact that it is the most frequently substantiated form of child maltreatment.

According to the U.S. Department of Health and Human Services, approximately half of the substantiated cases of child maltreatment pertain to child neglect. Although the act of child neglect may not be readily apparent as compared with physical and sexual maltreatment, child neglect may do just as much damage to a child's psychological and physical well-being. Contextually, child neglect is conceptualized as acts of omission, and the parent's actions may be either intentional or unintentional. According to Erickson and Egeland, child neglect can be differentiated into subtypes that include physical neglect, emotional neglect, medical neglect, and educational neglect. Of these different subtypes of child neglect, physical and medical neglect are the most common. Physical neglect pertains to failure to protect a child from harm or danger and not being able to provide for the child's basic human needs such as adequate housing, clothing, and food. This type of neglect is easier to substantiate due to the physical evidence involved (such as when a child attends school in tattered or inadequate clothes). Emotional neglect is sometimes categorized with emotional (i.e., verbal, psychological) abuse and is more difficult to substantiate since the harm that occurs to the child generally does not involve the presence of physical evidence. An example of emotional neglect would be a parent's repetitive lack of response to a young child's cries for warmth, support, and protection. Medical neglect relates to the failure to meet the medical needs of a child such as those procedures that would lead to the prevention or amelioration of disease or injury. Medical neglect also encompasses the failure to meet the mental health needs of a child if the child has serious emotional and/or behavioral disturbances. Finally, educational neglect occurs where a parent or guardian fails to meet the minimal state standards regarding educational needs for their child (e.g., having a child attend school on a consistent basis).

CONSEQUENCES OF ABUSE

There are numerous negative developmental consequences associated with child neglect. Generally, neglected children are at risk for delays in cognitive and language development, social and emotional withdrawal, anxiety symptoms, aggressive and inattentive behaviors, and lowered self-esteem. Neglected children are often unpopular, have difficulty forming and maintaining close attachments, have diminished capacity for coping with everyday demands, and by adolescence have been diagnosed with one or more psychiatric diagnoses. Academically, neglected children have lower scores on standardized tests, lower grades, and higher dropout rates. Extreme forms of neglect can lead to developmental delays, failure to thrive, and even death for younger and more vulnerable children. Both the short- and long-term consequences of neglect on a child's functioning have been found to be as severe and damaging to a child as other forms of maltreatment. Investigating the consequences of child neglect is difficult, however, because its impact is often compounded by other detrimental influences on child development such as poverty, accidental injury and trauma, and family dysfunction. Furthermore, the

specific physical, psychological, interpersonal, and academic problems that result from neglect are dependent on the specific type of neglect, the chronicity and acuteness of neglect, and the child's age and competence at the time of neglect.

RISK FACTORS

There is no identifiable single cause that leads to child neglect. Different contextual conditions (e.g., living in poverty, not having access to adequate health care) contribute to but are not consistent indicators of child neglect. Conceptually, risk factors can be categorized into three groups: (1) child risk factors, (2) family risk factors, and (3) social/environmental risk factors. For the child, risk factors related to disability and chronic illness may contribute to child neglect due to the increased needs of the child. Parent factors such as psychological problems (e.g., depression, substance abuse), having low social support, negative parent-child relationships, and high levels of parenting stress may place a child at risk for being neglected. Social and environmental factors such as poverty, homelessness, and lack of or inadequate medical and social services, while not causal, all contribute to an increased risk associated with child neglect. Although these risk factors are nonspecific, they provide useful information from which to develop policy and prevention programs to reduce the risk for child neglect.

PROTECTIVE FACTORS

Child, family, and social factors have been identified as having a protective quality against child neglect. Children who are in good physical and psychological health are less prone to be neglected. Children with good social, coping, and problem-solving skills are less likely to be the victims of child neglect. Parents who have a warm, caring, and overall positive relationship with their child are less likely to neglect their child. Parents who have a good social support network that allows them to seek support when needed are also less likely to neglect their child. Parents with low levels of stress and good coping skills are also less likely to neglect their child. In the social context, access to adequate housing and medical and social services are factors that decrease the incidence of child neglect. Overall, a supportive environment where the parent is not experiencing physical and psychological problems and has access to adequate medical, school, and social services reduces the probability of a child being neglected.

INTERVENTION EFFORTS

Identifying families who are at risk for child abuse and neglect is crucial for decreasing the prevalence of child neglect. Reporting suspected child neglect is required by law for many professions. All 50 states have mandatory reporting laws for any individual, regardless of profession, if child neglect is suspected. Suspected cases of child neglect should be reported to your local child protective services agencies. However, it is important to note that the reporting procedures and agency responsibilities may vary to some degree by state. Intervention can occur from one or several different agencies, such as child protective services, criminal justice, and the health-care system. These interventions focus on ensuring the health and safety of the child and removing any threat to the child.

Assessment for child neglect is typically more challenging than for other forms of child maltreatment because there are often no specific physical markers that can be isolated to neglect. Thus, with the exception of extreme cases of neglect, it is difficult to isolate the pattern of symptoms that results from child neglect from that that may result from other health, behavioral, and social factors. Despite this challenge, increasing attention to prevention and early intervention efforts seem to be promising in engaging the family in treatment and reducing risk. School and medical personnel are probably in the best position to identify families at risk for child neglect. Early intervention efforts targeting families who have young children and infants is crucial for future prevention. The current literature, while limited, speaks to the effectiveness of early intervention, showing that approximately half of families respond favorably to treatments that are long term and comprehensive in nature.

—Gary Fireman and Joaquin Borrego

See also Child Abuse

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U.S. Department of Health and Human Services. National Clearinghouse on Child Abuse & Neglect Information, http://nccanch.acf.hhs.gov/

CHILD REARING

Few child development experts would disagree that parenting has a significant influence on child psychological and behavioral outcomes. Furthermore, research has reported that the way in which a child is parented not only impacts childhood health, but also shapes the course of adult lives. A problem for parents is that advice from child professionals has periodically changed, ranging from a "spare the rod and spoil the child" philosophy that directs parents to control their children through the use of frequent and harsh discipline, to advising parents to become their children's "pals, buddies or best friends" by adopting a generally permissive style in which discipline is virtually absent.

Human development researchers have indicated more recently that a "roots and wings" philosophy of child rearing, which provides children with a secure base and opportunities for autonomous exploration of their environment, is best. Decades of child development research collectively suggests that children develop best in a variety of domains if parents foster a strong emotional connection with their children while also creating and permitting occasion for their children to experience independent learning.

HOW DO CHILDREN CONNECT (ATTACH) TO CAREGIVERS?

Attachment is the process through which children develop specific emotional bonds with any person who performs a large portion of the care in their first year of life. John Bowlby proposed that an infant's attachment to their primary caregiver happens as the result of infant signals and the caregiver's responses to them. This synchrony of interaction is characterized by a cadenced, mutually rewarding communication that occurs in infant-caregiver pairs in the early months of life. If a caregiver is unresponsive to the infant's signals of distress and fails to reward the infant's socializing attempts, attachment may be less secure. Therefore, the ideal infant-caregiver relationship is principally dependent on the infant's trust of the caregiver and the caregiver's protection of the infant during this early stage of their relationship.

Mary D. Salter Ainsworth, a developmental research psychologist, was interested in how infants' connectedness to their primary caregivers influenced infant social behaviors. Her attachment research described five sequential stages in the development of an infant's connection to a caregiver. She linked these stages to the infant's age and therefore its cognitive developmental level. Briefly, Ainsworth suggested that the infant's smiling and cuddling behaviors in the first 3 months were attempts to influence caregiver attachment responses and that throughout the toddler and preschool years children used other age-appropriate methods, such as mimicking the caregiver's actions or helping with household chores, to satisfy their need for connectedness with their parents.

Ainsworth demonstrated the effect of caregiver responsiveness to these infant attempts to garner connectedness by using what she termed the "strange situation." This research procedure exposed infants to a 20-minute period in which infants and caregivers (mothers in this protocol) were placed alone in an unfamiliar room for several minutes, followed by the entrance of a stranger who would attempt to engage the infant with a toy. The caregiver would then briefly leave the room while the stranger continued to distract the infant with the toy. After a brief absence, the caregiver would return to the room and attempt to comfort the infant. The infant's responses during each situation were recorded. Ainsworth found that infant reaction to the return of the caregivers was central to determining whether a secure or insecure infant-caregiver attachment existed, because the reunion indicated whether the infant was attached to a specific individual or if the infant considered its caregivers interchangeable. Four attachment patterns were noted using this research protocol:

1. *Secure Attachment.* These infants actively explored the novel environment and interacted with the stranger while the caregiver was present, and their distress at the caregiver's absence was reduced when the caregiver returned. These infants showed a specific connection to their primary caregiver.

2. *Anxious-Avoidant Attachment.* The infants in this group were indifferent to their caregiver when present, variably distressed when their caregiver left, and soothed equally well by a stranger as by their caregiver. These infants appeared to be uncertain of their caregiver and to less feel confident of her connectedness to them.

3. *Anxious-Resistant Attachment.* These infants can be best described as cautious of both caregiver and stranger. They were distressed when the caregiver left, but were not easily soothed when the caregiver returned. Again, these infants did not appear to have formed a specific connection to their caregivers and did not feel confident in any of the situations.

4. *Disorganized Attachment.* These infants demonstrated seemingly apprehensive behavior, such as moving toward the caregiver but not making eye contact. They appeared confused and sometimes dazed in all three situations. These infants were theorized to have been traumatized by abuse or parental neglect and to represent a minority of infants.

In a secure attachment, caregivers are believed to be more sensitive and appropriately responsive to their infant's signals, such as smiling at their infant when the infant smiles at them, encouraging verbalizations by talking to their infants, and comforting their crying or fearful infant. These responsive caregivers are also more emotionally available to their infants than caregivers in the other three insecurely attached patterns. Accordingly, infants demonstrating stranger anxiety and separation anxiety would actually be indicating that a specific, secure attachment has been made to their caregiver. Infants who appeared avoidant, resistant, or disorganized in their approach to seeking comfort from their caregiver indicate an insecure attachment as a result of caregivers who withdraw from interactions with the infant, are markedly intrusive or overly stimulate the infant, or who are erratically or unpredictably responsive to their infant's cues. In other words, securely attached infants had caregivers who were consistently responsive to their needs and emotionally interactive with them.

HOW DO INSECURE ATTACHMENT PATTERNS FORM?

There are several factors that may be responsible for the various insecure attachment patterns. A primary influence is the home environment in which the child lives. Homes that are impacted by instability in the marital relationship, domestic violence, parental unemployment, family poverty, or illness of a parent can disrupt a pattern of attachment. Individual and cultural differences in infants have been suggested as a factor affecting attachment development as well.

Because synchrony depends on both caregiver and child performing reciprocal behaviors, children who are preterm (and thus delayed in social development) or infants who have shy, fearful, or irritable temperaments are at risk for insecurely bonding with their caregivers. Infants born with significant problems such as autism, blindness, or deafness may also have attachment difficulties. These infants are at greater risk for being abused by parents as well, because their neediness, coupled with the delay in (or total absence of) displaying normal infant-bonding behaviors and the development of regular sleep and eating routines, makes parenting them a more intensive process.

Child-rearing practices differ significantly across cultures and subgroups, and any given population's values and beliefs may influence its infant-caregiver attachment patterns. For example, strange situation studies conducted with both Israeli kibbutzim and German children identified more of those children as insecurely attached to their caregivers. Researchers attributed these findings to the inherent child-rearing goals of these cultures, such as the communal parenting responsibilities in the Israeli kibbutzim and the focus on rearing autonomous and undemanding children in German society, rather than on bonding deficiencies. The psychological impact of parent-child connections in non-Western cultures has been recently debated. Some researchers claim that infant-caregiver attachment is paramount to healthy psychological functioning regardless of culture, while others argue that the meanings attributed to infant behavior in the strange situation are insufficient to determine the quality of the infant-caregiver bond in a non-Western population.

Although some researchers have suggested that a child's attachment pattern can be both stable and changeable (depending on the stability of their environment), Bowlby has argued that the pattern of attachment becomes an internal model by approximately age 4 or 5 and is relatively disrupted according to the child's age and characteristics of the parents. Thus, younger children would be more likely to experience a change in their internal model of attachment to a primary caregiver, from a secure to insecure pattern, following a family crisis such as divorcing parents, death of a parent, or abuse by a parent, than would an

older child. Conversely, the attachment of older children would be more resistant to change despite a disrupting event and more likely to generalize to other relationships. Bowlby also suggested that the reliability of attachment is relationship specific, with attachment patterns changing with some individuals but not others. For example, following the divorce of a child's parents, he or she might retain a secure attachment to one parent while shifting from a secure to insecure pattern with the other, depending on the quality of their pre- and postdivorce relationships.

Attachment research has clearly indicated, at least for Western cultures, that attachment patterns are likely internalized, generalized to child, adolescent, and adult relationships, and may persist in subsequent generations. Attachment in non-Western cultures appears to be better determined when the values and beliefs of the respective culture are first considered.

WHAT ARE THE CONSEQUENCES OF ATTACHMENT?

Attachment patterns in infancy have been linked to adolescent and adult social behaviors, as well as to the style one uses to parent one's own children. Several researchers have reported that infants identified as securely attached to their caregiver tend to be more socially skilled and positive in their adolescent and adult relationships. It is also reported that securely attached children are less clinging and less dependent on parents and teachers, are more emotionally mature in home and school settings, have higher self-esteem, are less likely to be socially aggressive or disruptive, and are more popular with peers. These children also appear to have an academic advantage in that they are more often rated as leaders and tend to get better grades. On the other hand, insecurely attached infants show more disruptive behaviors in adolescence and adulthood, and insecure attachment patterns have been linked to early sexual involvement, riskier sexual behavior, and sexual dysfunction in adulthood. For these reasons, attachment patterns have been implicated in childhood and adolescent social and academic success.

How we parent our children may also be linked to our own early attachment patterns. Developmental researchers have consistently reported that caregivers and infants share the same attachment patterns. That is, caregivers who were classified through testing as securely attached to their parent had infants who were securely attached to them. Conversely, caregivers who showed insecure attachment patterns had infants who were also insecurely attached to them. Consequently, we not only tend to parent our children as we were parented, but we also pass on an attachment style to our children and, quite possibly, to future generations.

WHAT ARE PARENTING STYLES AND PARENTING PRACTICES?

Child rearing is the process whereby parents teach their children the rules of the society in which they live, so that their children are prepared for an autonomous adult life. Optimal socialization prepares children to function well as adults and to continue to do so when their parents are no longer available to parent. Child-rearing practices, then, might be an important predictor of whether this socialization was successful.

The terms *parenting styles* and *parenting practices* are sometimes used interchangeably, but they actually refer to different aspects of parenting. *Parenting style* is a descriptor of a parent's attitudes, beliefs, and values regarding how parenting is best accomplished. *Parenting practices* are the specific behaviors, strategies, or methods parents use, based on their particular parenting style. So although the two concepts have different conceptual meanings in the developmental literature, they are intrinsically linked with regard to how parents rear their children.

Various authors have written about differences in parenting styles and practices in terms of their influence on child outcomes and in noting differences across cultures. Outcome investigations, similar to those in the attachment literature, typically use a predictive model to associate various parenting practices with child and adult characteristics such as emotional stability, social skills, academic abilities, and incidence of psychopathology. Cultural difference studies point to how ethnic or cultural values influence diversity in the implementation and meaning of various child-rearing practices, and how culturally shared beliefs guide parenting attitudes and practices. For example, Western cultures who value individualism may see autonomy as an ideal characteristic to shape in children, whereas collectivist cultures who value the common good would be more likely to discourage autonomy as a goal of child rearing. Important to note is that despite cultural differences, some characteristics such as parental warmth and responsiveness appear to be considered important across many cultures.

HOW DOES PARENTING INFLUENCE CHILD BEHAVIORS?

Diana Baumrind, an influential developmental psychologist, researched a "parenting style" theory that has become important to Western parenting ideology. She suggested that a person's parenting practices is embedded in their beliefs about how control of their offspring is related to the socialization process. She studied four dimensions of parental functioning: (1) warmth/nurturance, (2) clarity and consistency of rules, (3) level of expectations (maturity demands), and (4) communication between parent and child.

She connected each of these dimensions to various child behaviors. Accordingly, nurturing parents tended to raise more securely attached children and parental warmth was linked to high self-esteem, higher IQs, better school performance, and greater empathy for others. Conversely, parental hostility was linked to poorer school performance, higher rates of delinquency in adolescence, criminality in adulthood, and less socially skilled children.

Likewise, parents who were clear and consistent in their communication, who reliably enforced family rules, and who had high expectations (maturity demands) for their children tended to have children who were less defiant and more socially competent and who showed more empathy for others. Open and regular communication with children has been similarly associated with their emotional and social maturity.

According to Baumrind, these four dimensions occurred in high/low combinations that produced three distinct parenting patterns:

1. Authoritarian parents are low in nurturance/warmth and in communication with their children and high in control and maturity demands. These parents evaluate and attempt to control all behaviors and attitudes of their children. Family rules are typically in accordance with rigid traditional standards, and strict obedience is demanded, while open communication between parent and child is discouraged. These parents generally use punitive methods to discipline their children.

2. Permissive parents are low in maturity demands, communication, and control and high in nurturance. These parents exercise little or no control over their children and typically view themselves as their child's "friend." They have few maturity demands, so their children set their own schedules and priorities and learn about life without any kind of structure for such learning. Discipline in these families is usually absent or inconsistent.

3. Authoritative parents are high in all four dimensions. These parents acknowledge the power differential in the parent-child relationship, but because they believe their children have rights too, consider their children's point of view. Although they have high expectations (maturity demands) for their children, they use open and regular communication to explain and teach, rather than punitive disciplinary methods to control and stifle their children. They are less likely to stress obedience and more likely to encourage critical thinking and self-responsibility.

Baumrind found that each parenting pattern was associated with a specific pattern of early childhood behavior. Children of authoritarian parents tended to be less socially competent. These children often withdrew from, and would less often initiate, social contact. They were less intellectually curious and lacked problem-solving skills. Children of permissive parents were immature relative to their peers. They tended to have more difficulty with impulse control, independent action, and taking responsibility for their social behaviors. Children of authoritative parents were more self-confident, more self-reliant, more explorative, more self-controlled, and calmer than children in the other two parenting groups. Hence, children of authoritative parents exhibited better socialization skills and greater self-confidence than children who were raised by either authoritarian or permissive parents.

Baumrind's parenting categories were expanded by Eleanor Maccoby and John Martin, who proposed only two dimensions to categorize families: degree of demand or control (high or low) and amount of acceptance (high or low). They also identified four parenting styles, rather than three: authoritarian (high demand and control, low acceptance); permissive (low demand and control, high acceptance); authoritative (high demand and control, high acceptance); and an additional type, uninvolved/neglecting (low in demand and control, low in acceptance). Child outcomes for these parent types were consistent with Baumrind's descriptions of the authoritarian, permissive, and authoritative styles. However, they reported that the most consistently negative outcomes were associated with the uninvolved/neglecting parenting type. Children of uninvolved or neglecting parents generally had "psychologically unavailable" caregivers, who often had emotional problems or were substance abusers and who had also had an

insecure attachment to their own parents in infancy. According to Maccoby and Martin, these children had much more difficulty with impulsivity, social relationships, and academic achievement and were more likely to be conduct disordered.

Similar to the attachment research, parenting style research has child-related and culture-specific limitations. The development of a human child is so complex that it is more likely that an interaction between a child's environment (nurture) and their inborn characteristics (nature) influences child outcomes, rather than parenting styles and practices alone.

A child's preexisting temperament may, in part, influence the child-rearing strategies its parents use. Child development researchers have long indicated that children show distinct individuality in temperament in the first weeks of life, independent of either their parents' personality or parenting style. Moreover, these temperamental traits persist into the childhood, adolescent, and adult years. A classic study by Alexander Thomas, Stella Chess, and Herbert G. Birch identified three child temperament classifications based on children's activity level, regularity of bodily responses, reactions to strangers, adaptability to changes in their environment, mood, attention and distractibility, persistence, and intensity of reaction. They identified the following three "type of child" categories:

1. "Easy" children presented few problems for parents because they generally showed regularity in their sleep and feeding behaviors, had low or moderate intensity of reactions, did not withdraw from novel objects or persons, adapted quickly to new situations or routines, and displayed a positive mood. As infants, they were quick to develop routines, were less likely to tantrum as toddlers, and adapted to school and home schedules without difficulty.

2. "Difficult" children, in contrast, were erratic in their development of sleep and eating cycles in infancy, took a much longer time to adjust to routines, and cried more often and more loudly. During toddler and preschool years, these children became frustrated more quickly, engaged in violent tantrums, had more conflict with parents and siblings, and required more consistency and tolerance from parents.

3. The "slow to warm up" child displayed some of both the easy and difficult characteristics. These children usually had a low activity level, tended to initially withdraw from novel situations but would gradually adapt, had a moderately negative mood, but displayed low-intensity reactivity. As infants, they presented fewer parenting frustrations than the difficult children because they eventually developed regular feeding and sleeping schedules, but were still more problematic than easy children, who quickly established routines consistent with their parent's expectations. As toddlers and preschoolers, slow-to-warm-up children required much more effort by parents to help them adjust to the demands of school, but once acclimated, were not problematic.

According to Thomas, Chess, and Birch, children who fit their easy description may be much easier to parent because they respond positively to most parenting styles and will adapt to environmental changes much more quickly. Conversely, difficult children challenge parents from the outset. Parents experience many more daily battles, which result in the use of more punitive or inconsistent parenting, which in turn can exacerbate the child's negative mood and intense reactivity tendencies. Slow-to-warm-up children require patient parents who allow their child to adapt at his or her own pace while offering encouragement and support for trying new things. When a parental demand "conflicts excessively" with a child's natural temperament, the child will feel extreme distress and will react in a negative fashion. Parents who can recognize their child's temperament pattern and be responsive to it will have less conflict with, and more compliance from, their children. Consistent parenting approaches are essential because a mismatch of parental demand to child temperament will excessively frustrate parents and their children. Parents must acknowledge what their child can and cannot do (given his or her temperament) and adjust their expectations accordingly.

Although authoritative parenting styles and practices appear to best fit most child temperaments, this approach may not be effective for every child. The social skills of a shy child who is inherently reticent to initiate interactions with other people may be harmed by an authoritarian parent who controls his or her social contacts, whereas an overly active or excessively aggressive child may be better parented with the control strategies imposed by authoritarian parents. It is unclear whether authoritative parenting can moderate family conflict and stress, parent psychopathology, and poverty.

Parenting style has not been found to be predictive of the same child outcomes in non-Western cultures as it has in Western societies. Parenting styles and practices tend to differ across cultures due to the different

meanings the culture attributes to specific child behaviors. For example, African American parents view physical punishment as essential to protect their children from social dangers and enforce respect for parental authority, but their children do not show more externalizing behaviors than children of authoritative parents. Similarly, Arab cultures associate "autonomy granting" with "obedience to parents' wishes" rather than as a method to encourage their children to internalize parental values, and no differences between Arab and Western cultures in terms of child outcomes are reported. Children of authoritarian parents view their practices as normative for their culture, and as an indication of parental warmth and caring. Thus, the cultural meaning parents and children attribute to parenting methods might be more important to child outcomes than a universal parenting style. In fact, only parental warmth has been consistently reported to be a universally positive parenting characteristic in both Western and non-Western cultures.

HOW DO PARENTS LEARN TO BE PARENTS?

Parents typically enjoy most of their interactions with their children. The "hard work" of parenting occurs when guidance or discipline is necessary to address child misbehavior. How do parents decide how to discipline their children? Generally parents are heavily influenced by how they were parented themselves, because their childhood experiences are their primary, and often only, source of information for child discipline techniques. The relative success or failure, then, of parents' efforts to guide their children may be solely dependent on what they learned from their parents. If their parents used a limited repertoire of ineffective or inconsistent disciplinary strategies, then repeating this in their own families can result in frustration and poor child outcomes.

There is help for parents who want to go beyond their own family history of parenting. Programs designed to give both child development and child management information have become popular for parents wishing to supplement their parenting knowledge or learn alternate parenting strategies. Research suggests that educational experiences may buffer the effects of problematic parenting and decrease the transfer of risk to subsequent generations. Many of these programs contain content congruent with authoritative parenting ideas and emphasize skill building to help parents successfully provide their child with a sense of security (roots), while appropriately encouraging their child to explore and learn self-regulation (wings). Collectively, these programs consistently provide the following parenting advice:

1. Parents who are warm, nurturing, and responsive to their children's needs are more likely to develop a secure infant-caregiver bond and build a positive child-caregiver relationship. It is the parents' responsibility to provide physical and emotional nurturance for their children, not for children to supply these for parents.

2. Parents who value their children's ideas and activities by taking time to listen to children's thoughts, feelings, and experiences foster high self-esteem and better competency skills. Involvement in their children's daily lives provides opportunities for parents to shape their children's character and behaviors.

3. Parents need to model caring toward others, rational thought, behavioral self-control, emotional understanding, and social sensitivity in what they say and in what they do. It is important to remember that children say what their parents say and do what their parents do.

4. Parents who directly confront their children's behavior in a consistently decisive way with clear consequences for noncompliance orient children toward parent-preferred goals while providing stability in their understanding of parental expectations. Consequences should always fit the "crime." Parents who think before imposing consequences will have greater success in maintaining their resolve than those who impose punishment during an emotionally charged moment. A reasonable consequence will communicate a sense of fairness to children as well. Children learn more about what is expected of them when parents reinforce expected behavior, instead of just punishing disobedience. Positive feedback yields better compliance with family rules, while frequently harsh punishment conditions children to escape, often by lying, from consequences.

5. It is the parents' job to set standards of conduct for their children by remaining behaviorally focused, rather than attributing child misbehavior to a flaw in the child's character. Behavioral misconduct implies that change is possible and the transgression is time limited, whereas a defective character is more resistant to modification and more likely to generalize to other contexts.

6. The use of reason and persuasion to gain compliance is more effective than the use of power and manipulation. Parents who are firm, but reasonable, in their parental control and who take time to clearly explain the rules to their children are more likely to have children

who internalize their morals and values than children of parents who are arbitrary in their rule setting, assert their power, or withdraw their love from their children. However, flexibility in setting limits that match each child's individual characteristics is essential. Not all rules are necessarily appropriate for all children at all ages.

7. Parents who encourage their children to be independent thinkers, accept opposing points of view, and encourage verbal give-and-take teach their children to take responsibility for their thoughts, feelings, and actions and to accept differences in others. Reciprocity of thoughts and emotions teaches self-honesty and humility. Children see themselves as having more agency in their lives when parents resist using restrictive control of their children's thoughts and ideas.

8. Parents who do not overly control or restrict their children's experiences permit children to build confidence in their ability to handle varying and complex situations and give them the opportunity for learning about themselves and the world in which they live. The fear of children becoming emotionally or physically harmed is paramount for parents and causes them to worry about a negative outcome from allowing their children too much freedom. The decision about how much autonomy, or freedom of choice, a child should have must be child specific and age based, so that experiences are formative in nature rather than an overwhelming or harmful experience for the child.

SUMMARY

What is the best advice to parents based on current research? First, infants require parents who are warm and responsive to their physical and emotional needs so that a secure attachment can form. Second, authoritative parenting styles and practices, which encourage children to develop strong emotional bonds with their parents as a secure base for their autonomous exploration of their environment, are linked to optimal development in social and academic arenas and to a positive self-esteem. Third, it is a necessity that parents attend to their child's individual temperament and developmental needs and be aware of the reciprocal nature of the child-caregiver relationship. Fourth, cultural differences must be considered in the use of any parenting style.

—Kimberely J. Husenits

See also Parenting

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CHILDLESSNESS

In its strictest definition, childlessness occurs when people do not biologically bear children. However, this definition is limited and fails to address the complex

psychosocial factors that contribute to its causes and consequences. Most people are childless for large segments of their life and actively pursue not getting pregnant or having children.

In this context, childlessness is a normal human experience. Childlessness is a dynamic process that evokes different emotions and social reactions at different points in time, as well as an outcome. As such, the meaning of childlessness may change throughout the life course of the individual.

The social, psychological, economic, hormonal, and family pressures to reproduce are strong forces that result in childbearing being considered the norm. People who deviate from the norm may not only feel "different," but "stigmatized" because they do not have children. Childlessness implies not just the physical absence of children, but also strong emotional reactions that may include regret, loss, sadness, failure, grief, depression, embarrassment, or feelings of incompleteness as people do not have desired or expected offspring. From a life course perspective, childless people may feel awkward at times when their friends are pregnant or consumed with childbearing responsibilities, and they may be left out of conversations or events because they do not belong to the social group of "parents." People without children do not have automatic recipients for their material legacies (including possessions and property) or emotional and historic histories, as do parents, which creates a challenge at the latter stages of life.

This view varies dramatically from people who define themselves as "child-free," who see the absence of children as a liberating, positive experience. National organizations such as the National Childfree Association or Childless by Choice provide information and support to people who wish to pursue a nonchild lifestyle. People who are childless by choice are not antichild; they may simply not want one of their own. Couples who do not have children have more time to be together and more discretionary money with which to do interesting things, and they report higher levels of relationship satisfaction since they are not burdened with the financial, emotional, and time constraints of parenthood.

Two major forces contribute to people not having children. One is a push force, in which there are obstacles and challenges that prevent people from having children. Push forces are usually negative forces that get in the way of childbearing. These include lack of a mate or having a mate who does not want children, infertility, miscarriage, infant death, feeling that one cannot afford to have children, allowing jobs or education to take precedence, feeling that one's partner is not suitable parent material, a history of alcoholism, genetic problems, abuse that adults fear may get passed on to the child, or assumptions that they would not be a good parents. Pull factors are positive forces that encourage the adult into pursuing meaningful activities that are deemed more important and satisfying than parenthood. Pull factors are lifestyle choices that include wanting to go to school or pursue a career path, choosing a partner or relationship over parenthood, travel, recreation, and the active pursuit of goals that people want to accomplish. If people are childless, they may feel pushed into that outcome and have more of a negative feeling about not having children compared with people who were pulled to wanting something other than children. The choice involved with having children or not influences emotional well-being.

—Yvonne Vissing

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CHILDREN WITH SPECIAL HEALTH CARE NEEDS (CSHCN)

Children with special health care needs include those with chronic illnesses (e.g., asthma, diabetes, sickle cell anemia), physical disabilities (e.g., cerebral palsy, spina bifida), and developmental/emotional disabilities (e.g., autism, Down syndrome). Historically, children have been classified as having special health care needs based on whether they have been diagnosed with specific conditions. In the past decade or so, it has been recognized that this classification system is flawed and may exclude children with rare, undiagnosed, or

difficult to define conditions. In 1998, a working group established by the United States' Maternal and Child Health Bureau's Division of Services for Children with Special Health Care Needs published a new definition of children with special health care needs that was designed to be more inclusive of all children currently needing or who are at risk for needing special health or related services:

> Children with special health care needs are those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.

This new definition was created to help guide program planning for these children and their families. By not depending on specific diagnoses to classify children, the definition implicitly recognizes that children and families affected by different conditions have many common experiences. For example, many of these families face frequent disruptions of family and social activities and increased financial obligations due to their increased need for a wide array of community and professional services. These services may include frequent physician visits, allied health services, medical or orthopedic devices, and individualized education plans.

In addition to the above common experiences, families of children with special health care needs often have increased challenges associated with optimizing and maintaining the child's emotional development and self-concept. Due to the need for specialized services, or because of physical or academic limitations, children with special health care needs may feel stigmatized or simply "different" from their peers, which may in turn affect their emotional health and well-being. As advances in health care have allowed children with special health care needs to live longer and fuller lives, attention has shifted to focus on understanding their unique developmental and emotional needs.

However, the impact of an illness or disability on a child's cognitive, social, and emotional development varies over time as the child's developmental level changes. In addition, the implications of the illness/disability are different depending on the child's developmental level at its onset and the limitations of the disorder at each level of development. Professionals who work with children with special health needs must keep these changing developmental needs in mind. They must also understand the effects (both negative and positive) of the child's condition on the family system and how these in turn can affect the child's development. The way that medical treatment, allied health care, and other necessary programs are delivered can have lasting effects on the family's stress associated with the child's condition. Supportive care designed to ameliorate the negative effects of the condition can assist the family in managing the child's care and the burdens associated with it. Support groups for families, parent and child educational training about the condition, home care services, respite care, and other support services can prevent the accumulation of stress that can overwhelm a family's resources or hinder the child's development.

—Janeen C. Manuel

See also Individualized Education Programs (IEP)

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CHILDREN'S RIGHTS

THE UNITED NATIONS CONVENTION ON THE RIGHTS OF THE CHILD

The United Nations Convention on the Rights of the Child (UNCRC) is the clearest and most comprehensive expression of what the world community wants for its children. The Convention is the most universally accepted human rights instrument in history

(except for the United States and Somalia, it has been ratified by every country in the world) and is the only treaty that puts into legally binding form the entire range of human rights: political, social, economic, cultural, and humanitarian. The UNCRC arose as a reaction to the weakening global humanitarian response to children. During the momentum of the 1979 International Year of the Child, the government of Poland proposed a drafting process for a legally binding human rights treaty, thus taking the first steps in establishing the UNCRC. The United Nations unanimously endorsed the convention on November 20, 1989, and it became international law in 1990.

The 54 articles of the UNCRC can be divided into four main parts: guiding principles, rights articles, monitoring systems, and process of ratification. The four guiding principles are: nondiscrimination, best interest of the child, survival and development, and participation. Articles on rights apply to all children under 18 years of age and seek to safeguard and uphold children's minimal health, civil, humanitarian, and family rights. For example: protection of children against discrimination, abuse and neglect, and armed conflict is outlined in Articles 2, 19, and 38, respectively. Parent-child relationships are protected and defined in several articles (parental guidance, Article 5; parental separation, Article 9; and family reunification, Article 10). It calls on countries to ensure survival of children to the maximum extent (health care, food, and clean water, Article 24; education, Articles 28, 29). It articulates that children should have increasing opportunities to participate in society as preparation for responsible adulthood (name and nationality, Articles 7 and 8). Countries' obligations toward dissemination, implementation, and monitoring are spelled out in Articles 42 to 45. The final set of articles (46 to 54) outline the process of ratification.

The UNCRC focuses on the rights of the child from a developmental ecological perspective. It assumes that the child's overall development is a function of a number of factors (psychological, social, educational, and cultural) and contexts (home, school, community, and country). The UNCRC outlines the legal responsibilities of governments to ensure that children have the family support and resources to grow up to be responsible adults. The Convention reaffirms the fact that children, because of their vulnerability, need special care and protection and consequently has set standards in health care and education and in legal, civil, and social services.

The Convention has served as a vital tool for advocacy and programming. For instance, advocating for the demobilization of child soldiers in war-torn regions, such as Sierra Leone, was possible because of Article 38, which requires "that states parties take all feasible measures to ensure that persons who have not attained the age of 15 years do not take direct part in the hostilities" and further "refrain from recruiting any person who has not attained the age of 15 into their armed forces." A rights base approach to programming is evident in many early childhood intervention efforts around the world. For instance, Save the Children has developed the indicators to assess the quality of early child care programs in central and east Africa rooted in the framework of the UNCRC.

In conclusion, UNCRC has made a vital contribution to recognizing the fundamental dignity of the child by seeking respect for children, highlighting the importance of the family, and establishing clear responsibilities of the larger community (i.e., country) to uphold the rights of all children everywhere.

—Pia Rebello Britto

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CHOMSKY, NOAM (1928–)

Noam Chomsky is cofounder of the Department of Philosophy and Linguistics at the Massachusetts Institute of Technology (MIT) and a seminal figure in 20th-century linguistics, anarchism, and radical politics. He was born in Philadelphia, Pennsylvania,

in 1928 to William, foremost Hebrew grammarian, and Elsie (née Simonofsky), a Hebrew teacher also involved with Zionism, the Hebrew language, and Jewish cultural affairs. Since 1955, he has been with MIT, first as a researcher, then as cofounder of the Department of Philosophy and Linguistics, and now an Emeritus Institute Professor of Philosophy and Linguistics. His work contributes to linguistics, cognitive sciences, politics, history, law, and philosophy, and his approach contributes to the study of human development through his philosophy of the mind and his theories of pedagogy and language acquisition.

Chomsky was influenced early on by anarchists and anti-Bolsheviks, and then at the University of Pennsylvania by mathematicians, logicians, philosophers, and linguists, most notably Zellig S. Harris (1909–1992), with whom he shared interests in radical politics and left Zionism. His PhD thesis with Harris (published as "Syntactic Structures and Logical Structure of Linguistic Theory") was a study of linguistic forms through the arrangement of words and morphemes in sentences. He subsequently violated the norms of the linguistics field by pursuing the Cartesian idea that language is genetically determined, positing the existence of innate representational structures governed by rules, and then searching for discovery methods to identify the logical structure ("deep structure") that underlies all natural languages. The central insight of Chomsky's approach, already present in his graduate work, is that human languages can be formally modeled as the infinite sets of strings generated by computational devices with well-defined limited properties. Chomsky's work on transformational generative grammar had a seminal impact on our understanding of the development of the human mind, and his ideas of language acquisition contrasted with the behaviorism of B. F. Skinner and with Jean Piaget's views on the development of intelligence. The core notion of cognitive science is that mental processes can be usefully characterized as a set of interacting, formally described computational mechanisms, and Chomsky's work demonstrated that mental processes could possibly be formally and precisely modeled as computational processes. Chomsky's interest in characterizing how language was tied into the process of human thought led to his work on determining how human cognitive abilities are organized into a unity of mind and how the brain supports these abilities.

Outside of the language research, Chomsky is also involved in political work and crusaded against the Vietnam War. As in his seminal work *American Power and the New Mandarins,* he continues to critique American foreign policy. His analyses of the Middle East and Central America, long-standing local and international activism, and studies of the media combine to make him one of the most cited intellectuals in history.

—Robert F. Barsky

See also Language Acquisition Device, Language Development, Universal Grammar

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CHROMOSOMES

Chromosomes are large pieces of DNA that contain genes, other sequences of DNA, and associated proteins. Genes code for traits, and many of the additional sequences and associated proteins, are used to organize and to regulate the expression of the genes.

A typical human cell contains 46 chromosomes, which if stretched out and laid end to end, would be about 1 meter long. There are 23 different types of chromosomes, each containing a different set of genes. Each person has two copies (one from one's mother and the other from one's father) of each type of chromosome. The two copies contain the same genes in the same order but may carry different forms of those genes (alleles). Thus, any individual may have two identical copies of a gene (homozygous) or may have two different forms of the gene (heterozygous). Since genes are a sequence of DNA, different alleles vary in their DNA sequence. These variations can affect the presence, severity, or intensity of a particular trait in an individual.

The sex chromosomes make up one set of the 23 kinds of chromosomes. There are two forms of the sex chromosome, the X and the Y chromosome. If a zygote receives two X chromosomes, the individual will become female; if a zygote receives one X and one Y chromosome, the individual will become male. The X and Y chromosome pair differs from the other pairs in that they do not contain all of the same genes. The Y chromosome is smaller than the X chromosome and contains genes that determine maleness. Since women have two X chromosomes in their cells and only one is needed for proper functioning, one of the X chromosomes is randomly inactivated in each of the woman's cells.

During reproduction, gametes are formed that contain one copy of each of the chromosome types. This ensures that each new offspring will receive one copy of each chromosome from each parent. Since males contain one X and one Y chromosome, half of their sperm will carry an X and half will carry a Y chromosome. All eggs carry an X chromosome. The sex of the child is then determined by whether the sperm that fertilized the egg carries an X or a Y chromosome.

Because each parent gives one of each of their chromosomes to each child, there is a wide variety of different combination of genes, and this genetic variability results in the large diversity of people, even those in the same family. Since each child randomly receives half of his or her mother's genes and half of his or her father's genes, siblings share one fourth of their genes in common with each other. The only exception to this is in identical twins, who share 100% of their genes because they arise from a single fertilized egg that splits into two embryos.

Genetic diseases may arise from variant or mutant forms of genes. Many genetic diseases are recessive, meaning that both copies of the gene have to be mutant for the disease to occur. People that have one copy of the mutant and one copy of the normal gene are called carriers, and there is a 50% chance that they will pass the mutant allele to each of their offspring. There are also some dominant diseases that result from a mutation in only one copy of the gene involved in the disease. If a parent has a dominant disease, there is a 50% to 100% chance that he or she will pass this allele to his or her offspring.

—Therese Poole

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CHRONIC FATIGUE SYNDROME

Chronic fatigue syndrome (CFS) is a poorly understood and sometimes controversial illness thought to affect as many as 800,000 Americans. Individuals with CFS often report flulike symptoms with low-grade fever and body aches. CFS is often a diagnosis of exclusion, since other potential medical or psychiatric disorders must be ruled out before a diagnosis of CFS can be made. Currently, scientists use a CFS case definition,

which requires a person to experience 6 or more months of chronic fatigue of new or definite onset that is not substantially alleviated by rest, not the result of ongoing exertion, and results in substantial reductions in occupational, social, and personal activities. To be diagnosed with CFS, individuals also need to have the concurrent occurrence of four or more symptoms that did not predate the illness and persisted 6 or more months since onset (i.e., sore throat, lymph node pain, muscle pain, joint pain, postexertional malaise, headaches of a new or different type, memory and concentration difficulties, and unrefreshing sleep). Some research samples have included a high or low percentage of patients with critical CFS symptoms (e.g., postexertional malaise, memory and concentration problems), further complicating identification of comparable samples. A new Canadian case definition does include these critical symptoms (i.e., postexertional malaise, memory and concentration problems), and use of this case definition might aid in the selection of more homogeneous samples.

CFS came to public prominence in the 1980s. At that time, it was believed to be a rare condition affecting primarily upper-class White women, thus the pejorative term "yuppie flu." More recent epidemiological research indicates that the illness affects individuals from many different classes and ethnic/racial backgrounds and is more common among women.

The cause of CFS is unknown. Often individuals report a viral infection immediately prior to onset. Others may describe trauma, emotional stress, prolonged overexertion, or no particular precipitant before the appearance of symptoms. The lack of a biological marker has caused some within the medical community to theorize that CFS is a psychogenic illness. However, others adopt a more biopsychosocial explanation. Evidence does exist indicating that when the hypothalamic-pituitary-adrenal axis and sympathetic nervous system become upregulated—possibly due to heightened central nervous system sensitivity to stimuli such as cytokines—secretions of glucocorticoids and catecholamines (adrenalin and noradrenalin) are raised. This could result in an immune response shift, which could impair the body's defense against viral or intracellular bacterial infections. There might be multiple pathways leading to the cause and maintenance of the neurobiological dysregulations and other symptoms experienced by individuals with CFS. Depending on the individual and subtype, these may include unique biological, genetic, neurological, psychological, and socioenvironmental contributions. Subgrouping is the key to understanding how CFS begins, how it is maintained, how medical and psychological variables influence its course, and, in the best case, how it can be prevented, treated, and cured.

CFS is a highly stigmatizing illness. Many health care professionals continue to deny its existence. Research has demonstrated that even the name *chronic fatigue syndrome* leads to minimization of the severity of the illness. Individuals with CFS are often told, directly or indirectly, that their symptoms are purely psychogenic and are caused by depression or some other psychiatric disorder. Because the illness is not widely recognized, sufferers have difficulty being appropriately diagnosed and treated.

No specific treatment currently exists for CFS. Medical management consists of treating specific symptoms, such as medication to aid sleep or relieve pain. Comprehensive rehabilitation programs involving multidisciplinary teams might be helpful, and such programs might include cognitive-behavioral therapy, physical and occupational therapy, and even complementary and alternative therapies such as acupuncture and massage.

—Leonard Jason, Julie Donalek, and Susan Torres-Harding

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CHRONIC ILLNESS

WHAT IS CHRONIC ILLNESS?

A chronic illness is any medical condition that has a prolonged course and often interferes with physical and mental functioning. Chronic medical conditions may also be marked by periods of acute exacerbation that require more intensive medical attention. Examples of chronic illnesses include acquired immunodeficiency syndrome (AIDS), asthma, cancer, cerebral palsy, congenital heart disease, cystic fibrosis, hemophilia, insulin-dependent diabetes mellitus, leukemia, sickle cell disease, and spina bifida. Although chronic conditions can be life threatening, increases in medical knowledge and advances in technology have enabled many individuals with these medical disorders to live longer and lead productive lives. The presence of a chronic medical condition affects not only the individual diagnosed with the disease but the person's entire family. Because chronic illnesses are not curable, continual medical management and adherence to treatment regimens are necessary. Frequently, it is necessary for family members and the individual to assume a great deal of responsibility for managing the illness.

WHAT IS THE FREQUENCY OF OCCURRENCE?

It is estimated that 15% to 18% of school-aged children in the United States have a chronic medical illness or disabling condition, putting the number of children under age 18 with chronic conditions at 12 million (some examples given in Kliewer, 1997; Newacheck & Halfon, 1998).

CHRONIC MEDICAL CONDITIONS

Acquired Immunodeficiency Syndrome

AIDS is a life-threatening condition caused by the human immunodeficiency virus (HIV). HIV affects the body's immune system and interferes with a person's ability to fight off viruses and bacteria that cause disease. This makes the body more susceptible to opportunistic infections, such as pneumonia, meningitis, and certain types of cancers. Worldwide, an estimated 2.5 million children under the age of 15 are living with HIV. Mother-to-child transmission of HIV has accounted for approximately 91% of AIDS cases reported among children in the United States. Among adolescents, most cases of AIDS are a result of sexual contact with an infected partner or drug use with a contaminated needle. In the United States, it is estimated that two adolescents are infected with HIV each hour. Although there is no cure for AIDS, there are medications that can slow down the HIV virus and reduce the rates of opportunistic infections.

Asthma

Asthma is an inflammatory disorder of the airways characterized by difficulty breathing, particularly during an asthma attack. Asthma attacks can vary from mild to life threatening and involve shortness of breath, cough, wheezing, chest pain or tightness, or a combination of these symptoms. Asthma attacks are triggered by allergies, infections like colds or bronchitis, exercise, changes in the weather (from mild to cold), and smoke. Approximately 20 million individuals in the United States have been diagnosed with asthma. Asthma can be a life-threatening disease if not properly managed. Effective medicines such as bronchodilators and anti-inflammatory agents start working within minutes and have few side effects.

Cancer

The most common forms of childhood cancers include the leukemias, lymphomas, and those of the central nervous system and brain. It is estimated that 1 in every 330 children will develop cancer before age 19. Although children frequently have a more advanced stage of cancer when they are initially diagnosed and pediatric cancers are the leading cause of death by disease for children in the United States under age 15, many pediatric cancers also respond well to treatment. Recent estimates suggest that the overall 5-year survival rate is almost 75% (National Cancer Institute, 2004). Current treatment regimens are quite intense and often combine a course of surgery, radiation, and chemotherapy.

Cerebral Palsy

Cerebral palsy refers to a group of conditions that result when damage to the brain disrupts the brain's ability to control movement and posture. In about 70% of cases, brain damage occurs before birth,

although in a minority of cases it occurs around the time of delivery or in the first months or years of life. The condition affects approximately two to three children per 1,000 over the age of 3 years. Signs of cerebral palsy include difficulty with fine motor tasks, difficulty maintaining balance or walking, and involuntary movements. Some people with cerebral palsy are also affected by other problems that require treatment, including mental retardation, learning disabilities, seizures, and vision, hearing, and speech problems. The symptoms of cerebral palsy range from mild to severe; the disease is not progressive, and most children can significantly improve their abilities with appropriate health care and therapies.

Cystic Fibrosis

Cystic fibrosis is a genetic disease affecting approximately 30,000 children and adults in the United States. The body produces abnormally thick, sticky mucus that clogs the lungs and leads to life-threatening lung infections. These thick secretions also obstruct the pancreas, preventing digestive enzymes from reaching the intestines to help break down and absorb food. People with cystic fibrosis have a variety of symptoms, including salty-tasting skin; persistent coughing, wheezing, or shortness of breath; excessive appetite but poor weight gain; and greasy, bulky stools. Clearing mucus from the lungs is an important part of the daily treatment regimen. The median age of survival for a person with cystic fibrosis is 33.4 years, a significant increase over earlier times.

Insulin-Dependent Diabetes Mellitus

Diabetes is a disease in which the body does not produce or properly use insulin, a hormone needed to convert sugar, starches, and other food into energy. There are two major types of diabetes. Type 1 diabetes, accounting for 5% to 10% of diabetes diagnoses, results from the body's failure to produce insulin. Type 2 diabetes, which accounts for the remaining, results from the body's failure to properly use insulin. Common symptoms of diabetes include frequent urination, excessive thirst, extreme hunger, unusual weight loss, increased fatigue, irritability, and blurry vision. There are 18.2 million people in the United States who have diabetes; unfortunately, nearly one third of these people are unaware that they have the disease. Diabetes management involves adhering to special dietary and exercise guidelines, as well as receiving insulin daily.

Sickle Cell Disease

Sickle cell disease affects approximately 72,000 people in the United States, mostly those of African descent. An inherited blood disorder affecting red blood cells causes them to become sickle shaped and tend to get stuck in narrow blood vessels, blocking the flow of blood. Complications include pain episodes, strokes, increased infections, leg ulcers, bone damage, yellow eyes or jaundice, lung blockage, kidney damage, blood blockage in the spleen or liver, eye damage, and delayed growth. Sickle cell disease management includes taking folic acid daily to help make new red cells, taking penicillin daily until age 6 to prevent serious infection, drinking plenty of water, avoiding extreme temperatures, and avoiding overexertion and stress.

Spina Bifida

Spina bifida, the most common neural tube defect, affects approximately 1 out of every 1,000 newborns in the United States. Spina bifida results from the failure of the spine to close properly during the first month of pregnancy. Surgery is generally performed on the newborn. In addition to physical limitations, spina bifida can also cause bowel and bladder complications, hydrocephalus (fluid in the brain), and learning disabilities. Taking 400 µg of folic acid every day before and during early pregnancy reduces the risk of spina bifida and other neural tube defects. Most children born with spina bifida live well into adulthood as a result of sophisticated medical techniques.

PSYCHOSOCIAL ADJUSTMENT TO CHRONIC ILLNESS

Research regarding adjustment to chronic illness suggests that children and adolescents with chronically ill conditions are at some risk for psychological problems and psychosocial adjustment difficulties. However, the coping ability and adjustment of a child or adolescent with a chronic illness depends on multiple factors. Risk factors include the degree to which the illness impairs functioning, involvement of the brain, nature of the illness, and type of medical procedures and hospitalization experiences. Risk factors related to the individual include interference with

non-illness-related aspects of life; family functioning; the individual characteristics and internal resources of the child; demographic variables such as age, sex, and social class; and external resources and support systems. Various interventions, including education, cognitive-behavioral strategies, social skills training, remediation and rehabilitation, and family therapy and group work, have been used successfully with children and adolescents with a chronic illness.

SUMMARY

Recent medical and technological advances have resulted in children and adolescents with chronic medical conditions living significantly longer lives. However, the stress associated with these conditions places individuals at greater risk for psychosocial adjustment difficulties. Health care professionals and parents should recognize the risk factors related to adjustment difficulties and implement appropriate interventions.

—Julie Maikranz and Michael C. Roberts

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CHRONOLOGICAL AGE

As we traverse the path from birth to death, chronological age (CA) provides a simple and convenient signpost for all that happens along the way. Birthdays have assumed the form of a personal holiday for almost everyone, marked with pleasure in the earlier stages of life, and often with regret and ill humor in the later years as the life span approaches its end point. This CA end point, however, may be considerably lower than human biological potential. Recent scientific demonstrations of longevity extension in rats through caloric restriction have opened up the future possibility of vastly extended CA limits for humans, raising utopian hopes as well as a host of ethical questions.

Along with sex and race (or ethnicity), CA is a visibly salient attribute of all human beings. This does not imply complete accuracy in identifying individuals on the basis of those attributes. Androgynous-appearing individuals may be difficult to categorize as male or female, and visual cues of race (or ethnicity) are sometimes misleading. In the case of age, it is not the precise CA that is recognizable, but rather the broad age category to which the person belongs (e.g., preadolescent, adolescent, mature youth, middle aged, and elderly). Finer differentiation of such categories almost certainly occurs, with preadolescents divisible into preschool and primary school children, for example, and the elderly readily separable into the young-old and the old-old.

At what point in development do these differentiated age categories emerge? The evidence indicates that preschoolers in the CA range between 3 and 4 years of age link CA to height. This implies that such children would be quite incapable of making age distinctions within the adult range. By age 5, however, almost all children have become sensitized to the physiognomic features associated with aging (e.g., wrinkles and hair color), and their age ranking of photographs of people ranging across the life span closely matches the corresponding ranking of adults. Furthermore, when children have learned to make these CA differentiations, their liking and attractiveness rankings of the photos begin to follow the age rankings, with the more elderly photos found less attractive and least liked. One can discern the beginning of age stereotyping and ageism in these data.

CA is a simple marker for noting the passage of time in a person's life. Yet CA has profound meanings for everyone. These meanings are reflected in the research on age norms—the indication that various important life events are expected to take place within a circumscribed CA range. Events such as formal completion of education, marriage, birth of first child, and retirement elicit relatively narrow CA ranges for being "on time." The implication is that an event falling outside of the designated acceptable age range is "off time" or deviant, and possibly maladaptive, for the individual concerned.

This idea of CA as a constraint was contested in subsequent research, where it was demonstrated that the effects of being "on time" versus "off time" revealed

few differences. On the basis of such outcomes, Bernice Neugarten (initiator of the tradition of age norm research) advanced the radical proposal that we had become an "age-irrelevant society." However, more recent replications of the original age norm studies have made it clear that age norms are currently looser (the acceptable CA range for various life events has considerably widened), but there is no indication whatever that age norms have essentially vanished.

Age norms represent but one aspect of the cognition of age. Other aspects include the spontaneous tendency to categorize individuals on the basis of their CA (rather than other attributes of the person) and judgments of the CA onset of the various age stages cited earlier. As research along these lines has proceeded, there has come the realization that age cognitions might well be influenced by gender, both that of the respondent and that of the target person evaluated. The claim that the meaning of CA is moderated by gender was given prominence by the essayist Susan Sontag in an article entitled "The Double Standard of Aging." Sontag argued that the physical attributes of aging (e.g., wrinkling, graying hair) are positively evaluated as signs of virile maturity in males, but are negatively evaluated as signs of loss of youth and attractiveness in females. These distinctively different evaluations are attributed in part to the mass media subscribing to the values of a patriarchal Western culture. Experimental efforts to test Sontag's claims with both verbal and photo materials yielded suggestive confirming evidence that CA is a more salient dimension for males than for females when judging others. Furthermore, males exhibit a stronger youth bias, particularly in their affective preferences for females.

Although there is empirical support for a double standard of aging, the interpretation of the phenomenon remains controversial. Arguing against the sociocultural view that the Western media promote the double standard, evolutionary psychologists have examined CA in mate preferences (as well as actual marriage data) in cross-cultural investigations. Comparable effects are observed across Western and non-Western cultures, males preferring females younger than themselves, and females preferring males older than themselves. Interpretation has stressed males' sensitivity to cues of reproductive value or potential in females (linked to youth) and females emphasis on male resources (linked to an older CA). Most dramatic are the CA preferences provided by middle-aged and older males who generally prefer and select mates as much as a generation younger than themselves.

In sum, the implications of chronological age cut across the developmental, sociopsychological, and biological sciences. CA is much more than a simple demographic descriptor.

—Nathan Kogan

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CIRCADIAN RHYTHM

Circadian rhythms refer to regular or rhythmic variations in biological and behavioral measures approximately ("circa") on a 24-hour or daily ("dian") timing basis. Virtually all biological and behavioral measures taken over time show circadian rhythms. For example, core body temperature normally reaches its highest value in the early evening and lowest value between 4 and 6 a.m.

Our biological circadian rhythms strongly determine our level of alertness and ability to sleep. At our maximum core body temperature, our alertness is greatest. At the minimum body temperature, alertness is diminished and sleepiness is maximum. Night shift workers experience these effects when they have difficulty maintaining alertness on the job at around 4 to 6 a.m., but then have difficulty sleeping during the day. Another example is the difficulty with nighttime sleep and daytime alertness following transmeridian jet travel, known as jet lag.

Our circadian rhythms can drift later or earlier and cause difficulties sleeping at our chosen times. Evening types or "night owls" have difficulty getting to sleep before midnight and difficulty arising early. They will lose sleep if they have to stick to a consistent early wake-up time. Sleep-onset insomnia is associated with late timed circadian rhythms. Morning types or "larks," in contrast, struggle to stay awake in the evening but then have difficulty maintaining sleep. This can lead to early morning awakening insomnia caused by circadian rhythms timed abnormally early. If the difference between maximum and minimum values in a rhythm (amplitude) is reduced, it can impair daytime functioning and disturb nighttime sleep.

During postnatal development, there is a progressive shift from a 4-hour sleep/wake rhythm toward increasing amplitude circadian rhythms and the consolidation of sleep into the night period. This consolidation is usually well progressed by the age of 6 months and complete by early school years. However, the broken sleep of infants can disrupt parental sleep and be stressful to a family. A common circadian rhythm difficulty in adolescence is a delayed rhythm in which the early evening alert period is delayed, making it difficult to initiate sleep before midnight. Awakening for school at 7 a.m. is doubly difficult due to insufficient sleep and the maximum sleepiness associated with the low body temperature occurring at that time. Attempts to catch up on lost sleep on the weekend by sleeping in late only further delay the circadian rhythms and exacerbate the problem. The middle-aged and older populations more commonly have the opposite problem of early timed circadian rhythms and early morning awakening insomnia. The elderly in nursing homes often have reduced amplitudes of circadian rhythms associated with reduced daytime activity and very disturbed nocturnal sleep.

Circadian rhythms can be retimed and amplitudes enhanced. The best known tool for retiming the rhythms is bright light visual stimulation, particularly light from the blue end of the color spectrum, which can be provided by daylight. In infants and the very elderly, amplitudes of circadian rhythms can be enhanced and timing of rhythms stabilized with increased daylight exposure. The delayed rhythm problems of adolescents can be treated with consistent early morning daylight exposure. The early morning awakening problems in older people can be treated with evening bright light and avoidance of early morning daylight. Where daylight is insufficient in the winter, especially in northern latitudes, portable light devices have been developed to be of therapeutic benefit.

—Leon C. Lack

See also Biological Clock

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CIRCUMCISION

Circumcision is the surgical removal of the foreskin from the penis and is practiced by Jews, Muslims, and Coptic Christians. Circumcision was practiced by Egyptians in antiquity and is now prevalent among many African tribes. Among Jews, circumcision is performed on the 8th day after birth and is also required of male proselytes as an integral part of the conversion procedure. If circumcision is delayed for any serious medical consideration, 7 full days must elapse subsequent to the complete recovery of the child before circumcision may be performed.

As recorded in Genesis 17:11, circumcision is a sign of the covenant entered into between God and Abraham. Rabbinic literature is replete with additional suggestions concerning the symbolism represented in the rite of circumcision. Of particular significance is the concept that removal of the foreskin, which constitutes a physical obstruction, is symbolic of the removal of the spiritual barrier which may separate the heart of man from God. An indication of the central role of circumcision in Judaism is the fact that, although letting of blood is generally forbidden on the Sabbath, circumcision

is performed on the 8th day even when it occurs on the Sabbath. It is significant to note that there is no rabbinic source indicating that the purpose of circumcision is avoidance of disease or promotion of health.

In Jewish teaching, circumcision is incumbent not only upon Jews but also upon all descendants of Abraham. Since circumcision is not discussed in the Koran, it is probably that tradition that gave rise to the practice among Muslims. Jewish tradition requires excision of the foreskin and exposure of the corona for all males of Abrahamic descent and, for Jews, removal of the underlying mucus membrane covering the glans as well. Jewish practice also requires that blood flow freely from the wound and employs suction in order to guarantee free flow of blood. For this reason, surgical procedures involving use of a clamp designed to cause necrosis and subsequent sloughing off of the tissue is not sanctioned. Talmudic sources indicate that the requirement for suction of blood is designed to prevent endangerment of the child, that is, the flow of blood cleanses the wound and prevents infection. Some rabbinic authorities permit laser surgery for the circumcision of hemophiliacs.

The attitude of the medical profession toward circumcision has had a checkered history. Circumcision is historically the only example of a prophylactic surgical procedure. Alleged medical benefits include a decrease in the incidence of urinary tract infection and resultant kidney disease, lower susceptibility to sexually transmitted diseases, as well as a lower rate both of cancer of the penis and of cervical cancer in sexual partners. Circumcision among non-Jews in Western countries was uncommon until late in the 19th century, when it became increasingly popular as a health measure. The circumcision rate in the United States reached a height of more than 80% in the post–World War II years. The rate declined subsequent to the finding of the American Academy of Pediatrics in the 1970s that "there is no absolute medical indication for routine circumcision of the newborn." Strident opposition to circumcision then developed in some circles on the grounds that the procedure constitutes an unwarranted trauma inflicted upon the newborn. In 1989, a task force of that organization found that the procedure did indeed yield some medical benefit. In a 1999 statement, the American Academy of Pediatrics found circumcision to be a significant factor in preventing urinary tract infection but did not find grounds to warrant a recommendation for routine circumcision. Recent studies indicate that circumcised males may have a diminished risk of contracting syphilis and human immunodeficiency virus infection.

—J. David Bleich

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Circumcision Information and Resource Pages, http://www.cirp.org/

CLASSICAL CONDITIONING

We are constantly making predictions about events that may happen in our environment and actively seeking information with predictive value. Predictability is so important that the signs used to make predictions also acquire affective value in their own right. Classical or Pavlovian conditioning is the mechanism that endows signals with predictive value and transforms them into events with affective significance. Consider the following example involving a change in preference for the ingestion of water. Six-month-old infants consume less water than formula, but this can be altered using a conditioning procedure. In a first stage, a scent is applied to the formula bottle so that the scent becomes a signal for the formula. In technical terms, the scent is called the conditioned stimulus (CS), the formula is called the unconditioned stimulus (US), and the trial is described as a CS-US pairing. In a second stage, the scent CS, now transformed into an appetitive stimulus, is applied to a water bottle and, as a result, infants consume more water than they had consumed before scent-formula pairings. Thus, the scent CS acquired signaling and affective value as a result of classical conditioning. In this example, the scent signals the impending presentation of the formula and also reinforces water consumption.

The distinctive feature of classical conditioning is its response-independent procedure for US administration. Although typically some form of behavior is measured at the time of CS presentation, the occurrence of a response is not required for US delivery. Despite this feature, behavioral changes may still be the result of instrumental learning (i.e., response-US contingency), rather than of the CS-US pairings. This can be clarified by introducing omission contingencies, in which the occurrence of a response cancels the presentation of an appetitive US, itself delivered only when the response does not occur. Unlike instrumental

responses, Pavlovian responses are less modifiable by omission contingencies, occurring reflexively as a result of the predictive and affective value of the CS. For example, approach responses tend to be Pavlovian; thus, in an omission contingency experiment, approach to a CS signaling food or a receptive sexual partner causes the animal to lose the US—yet, these response may occur at relatively high rates.

A proper demonstration of conditioning requires a distinction between the effects of CS-US pairings and the individual effects of the CS and US. The original response to the CS may increase after exposure to the US (sensitization); moreover, the repeated elicitation of a response by the US may cause other stimuli to elicit the same response (pseudoconditioning). Sensitization and pseudoconditioning mimic classical conditioning without being associative phenomena (hence, they are called nonassociative). Controls that eliminate nonassociative effects must be included in demonstrations of classical conditioning. For example, the CS and US may be presented an equal number of times in a control and in an experimental group, but explicitly unpaired from each other in the control group. Most control conditions introduce their own problems. The choice of an appropriate control often depends on the nonassociative effects that need to be eliminated.

Classical conditioning has been implicated in situations involving behavioral changes, changes in the response to drugs, neural-immune interactions, causal judgments, protective reflexes, fear conditioning, the development of attachment in young organisms, and endocrine responses, among others. Although it can be isolated under laboratory conditions, classical conditioning is often embedded into complex contingencies, including instrumental learning and behaviors mediated by language, where it can provide predictive value and regulate the acquired affective significance of stimuli. The elucidation of classical conditioning mechanisms is providing a detailed picture of how the brain acquires, stores, and retrieves information.

—Mauricio R. Papini

See also Learning, Operant Conditioning

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CLUSTER SUICIDE

Cluster suicide refers to the occurrence of two or more suicides or suicide attempts, or both, that occur closer together in time and geographic space. Of all the different age groups, teenagers are more susceptible to cluster suicide than others, accounting for about 100 to 200 deaths every year in the United States. It has been estimated that about 1% to 5% of all completed suicides among teenagers and young adults occur in clusters. The extent of clustering in suicide attempts however, is difficult to estimate due to the underreporting and misreporting of attempts.

Cluster suicide is more commonly seen among religious cults, prison inmates, marine troops, high school students, college students, and psychiatric inpatients. There are two types of suicide clusters: mass clusters and point clusters. In mass clusters, suicides and suicide attempts follow media portrayal of an actual or fictional suicide or suicide attempt.

Glamorization of death by suicide results in a chain reaction among those who are psychologically vulnerable. Point clusters, on the other hand, occur locally; for example, a suicide of a teenager in the neighborhood triggers a series of attempts or completed suicides by peers. Geographical area is a common denominator in point clusters.

The existence of mass suicide clusters has been documented worldwide following fictional depiction of suicide. There is a general consensus among suicidologists that newspaper and television coverage of suicide has a detrimental effect on suicidal behaviors. There is also evidence of outbreaks of suicidal behavior that occurs in high schools, often reaching epidemic proportions. These point clusters typically occur in institutional settings like schools and psychiatric hospitals, although proximity is not a prerequisite.

Vulnerability to suicide or suicidal behavior increases in the presence of negative life events like the death of a loved one or a traumatic loss. Similarly, having a psychiatric diagnosis, being unemployed, experiencing health crises, and lack of family support are potential risk factors for suicide. A possible explanation for suicide clusters is that humans tend to group together because of similar personal traits and temperamental characteristics. When one member of the cluster becomes suicidal and attempts or commits suicide, it consequently puts the others in the cluster at a higher risk.

Increased risk for cluster suicide among adolescents can be attributed to unintentional glamorization and glorification of suicide by the school system, which makes suicide attractive to vulnerable teenagers. A common environmental stressor sometimes influences clustering of suicide among those who are exposed to it.

It is important to differentiate between imitation suicide or copycat suicide and cluster suicide. In imitation suicide, the phenomenon of contagion impacts those who are in close proximity to the person who commits suicide. For example, studies have documented an increase in both suicide and suicide attempts among adolescents following the suicidal death of a parent. A somewhat rare form of clustering is known as a suicide pact, in which two or more individuals simultaneously plan and commit suicide. Suicide pacts are common among close friends or life partners.

In order to prevent cluster suicides from occurring, it is important to educate parents and teachers in schools and avoid the glorification and media coverage when a suicide occurs in an institution. Conducting school-based postvention efforts in terms of offering counseling services to students is of vital importance following a campus suicide or suicide attempt. The Centers for Disease Control (CDC) recommends delivering a public response that minimizes glamorization of suicide and glorification of the victims of suicide and conducting timely evaluation and intervention with close friends of the deceased who may be at high risk. Educating family members is also crucial because family support and presence of family strengths mediate the impact of stressors.

—Lavina M. Noronha

See also Parasuicide, Suicide

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COCAINE

Cocaine is a frequently used central nervous system (CNS) stimulant that enhances energy and mood. It is also a dangerous drug of abuse, the subject of much regulatory legislation, and a major target of the "war on drugs."

HISTORY

Cocaine is a naturally occurring substance found in the shrub *Erythroxylon coca* that grows in the eastern highlands of the Andes in Bolivia, Peru, Ecuador, and Colombia. Native inhabitants of this region are known to have chewed coca leaves, usually in combination with lime, for at least 5,000 years. In 1551, the Spanish conquistadores condemned this practice as "an evil agent of the devil" but soon discovered that, without the drug, natives could barely work the fields or mine gold (at altitudes of more than 8,000 feet). Thus, crops were cultivated and leaves were distributed to workers three or four times a day in order to ward off hunger and fatigue.

In Western Europe and North America, significant use of cocaine did not emerge until the middle of the 19th century, when the pure alkaloid (cocaine) was isolated. Three men were particularly influential in increasing the popularity of the drug. The first of these, Angelo Mariani, was a French chemist who made and sold many products containing cocaine, including lozenges, tea, and, most notoriously, wine (Vin Mariani).

The second proponent was the "father of modern surgery," Ward S. Halsted, who administered cocaine to his patients via the newly invented hypodermic syringe to induce local (topical) anesthesia. According to the Controlled Substances Act of 1970, which regulates the supply and distribution of drugs in the United States, this is currently the only legitimate medical use of cocaine.

Finally, Sigmund Freud, another father (of psychoanalysis), advocated the use of small doses of cocaine to combat alcoholism, depression (or, like Sherlock Holmes, boredom), indigestion, and, perhaps most interestingly, to treat the withdrawal symptoms and "cravings" of people who were trying to stop using another addictive drug, morphine. In this respect, Freud resembles contemporary pharmacotherapists who promote the use of methadone, naloxone, or buprenorphine to treat heroin addiction. While such therapies have many benefits (at least in part because they are legal and heroin is not), we are now faced with a new problem—addiction to methadone. Interestingly, heroin was first synthesized (by Bayer, AG) as a potential, nonaddictive opiate, to be used as a substitute for morphine.

By 1885, one pharmaceutical company (Parke, Davis) had marketed 15 different products containing cocaine. These included cigarettes, cigars, and inhalants. One year later, a Georgia pharmacist, John Pemberton, invented a new beverage, *Coca-Cola*, that, from 1886 until 1906, contained both cocaine and another, less potent CNS stimulant, caffeine. Shortly thereafter, cocaine use spread across the United States to such an extent that, in 1910, President Taft declared the drug to be "public enemy number one." In 1914, the Harrison Narcotic Act prohibited the inclusion of cocaine (as well as opium) in patent medicines.

The use of cocaine, which was relatively stable from the 1920s to the 1960s (with relatively benign effects), increased dramatically during the 1970s and 1980s (to more than 10 million individuals in 1984) despite additional efforts by the U.S. government to limit its use. Moreover, this increase was accompanied by reports of dependence liability and toxicity. One reason for these developments, although certainly not the only one, is related to the way in which cocaine is administered. South American Indians chewed coca leaves, which contain small amounts of cocaine in a form that is absorbed relatively slowly from the gastrointestinal tract into the bloodstream (and brain). In contemporary North America, however, cocaine is usually self-administered in more concentrated form, either intravenously or, most recently, by smoking "crack." Each of these routes produces more rapid effects, including psychological and possibly physiological dependence.

PHARMACOLOGY

Coca leaves typically contain between 0.5% and 2% cocaine. To extract the pure drug, the leaves are soaked and mashed to form a paste, which, after the solvent evaporates, contains 60% to 80% cocaine. The paste is converted to a water-soluble salt, cocaine hydrochloride, which is a pink to off-white powder that can be taken orally, intranasally ("snorting"), or by intravenous injection and is the form that is now exported around the world. While the salt is vulnerable to pyrolysis (heat-induced breakdown), which prevents it from being smoked, the drug can be transformed back into its free base form ("crack" or "rock") by dissolving it in baking soda and water.

Different routes of administration produce different patterns and levels of cocaine concentration in the blood. Extremely rapid absorption occurs with both intravenous injection and smoking; absorption is slower following oral administration or snorting. Once

in the body, cocaine is widely distributed and metabolized rapidly into two substances, ecgonine methyl ester and benzoylecgonine, both of which are excreted in the urine. However, because the acute effects of cocaine have a rapid onset and relatively brief duration, detection of measurable amounts of either cocaine or its metabolites (and, thus of cocaine use) is difficult.

The local anesthetic properties of cocaine (above) are the result of the drug's ability to block the conduction of nerve impulses within neurons by preventing the influx of sodium (Na^+) ions, which are necessary for the generation of action potentials (neuronal firing). However, the mechanism that underlies most other effects of cocaine, including its stimulant and addictive properties, involves the enhancement of the actions of neurotransmitters (intercellular messengers), such as dopamine (DA), norepinephrine (NE), and serotonin (5-HT), by blocking their cellular reuptake by plasma membrane transport proteins. The mesocorticolimbic or limbic-extrapyramidal DA system appears to play a particularly important role in the acute, CNS effects of cocaine and other reinforcing drugs. The neurons of this system arise from cell bodies in the ventral tegmental area (VTA) of the midbrain and innervate the nucleus accumbens (NAc), ventral caudate-putamen, and the prefrontal cortex (PFC). Other neuronal systems, including those involving both excitatory (glutamate) and inhibitory (γ-amino butyric acid, GABA) amino acid neurotransmitters, might be involved in some of the chronic behavioral effects of the drug, including cocaine "craving."

BEHAVIORAL EFFECTS

The effects of cocaine are similar but not identical to those of other stimulants such as *d*-amphetamine and methamphetamine ("speed"). In humans, they include mood amplification (both euphoria and dysphoria), heightened energy, sleep disturbances, insomnia, motor excitation, restlessness, talkativeness, hyperactive ideation, increased sexual interest, anger, verbal aggressiveness, mild to moderate anorexia (loss of appetite), and inflated self-esteem. When administered intravenously or smoked, the drug can also produce a "rush" that is sometimes described as being even more intense than an orgasm. Cocaine also has a variety of physiological (sympathomimetic) effects, including increasing heart rate, blood pressure, locomotor activation, and, at higher doses, stereotyped behavior.

Humans and other animals (rats, pigeons, monkeys) can be taught to discriminate between the effects of cocaine (the cocaine state) and the absence of these effects (or the presence of other drug states). These effects generalize readily to other stimulants such as *d*-amphetamine, methamphetamine, and methylphenidate (Ritalin), suggesting that these compounds have similar mechanisms of action.

When humans or other animals are given the opportunity to self-administer cocaine either intravenously or through surgically implanted cannulae directly into regions of the brain such as the VTA, NAc, or PFC, even naïve (nondependent) subjects do so quite readily. This suggests that cocaine is reinforcing and therefore has a high potential for abuse. Unlimited access to the drug may lead to compulsive use accompanied by weight loss, convulsions, and even death.

COCAINE ABUSE

While cocaine use seems to have "leveled" off in the 1990s and continues to this day at an estimated 1.5 million individuals in the United States, reports of cocaine dependency (addiction) and toxicity continue to increase. In addition, many cocaine users and former users have turned to even more potent and more toxic substances, including methamphetamine ("ice"), mixtures of amphetamines and heroin, and methylphenidate (Ritalin).

As mentioned previously, cocaine users feel an initial "rush" or sense of well-being, of having more energy, and being more alert. However, this effect quickly wears off, leaving the user feeling more "down" or depressed than before he or she took the drug. This feeling leads to more cocaine use, sometimes just to feel "normal." Over a period of time, both the amount of cocaine needed and the frequency of use have to be increased to maintain the "high" (tolerance). When more cocaine is not available, users frequently turn to other drugs such as alcohol; such combinations or synergisms (e.g., alcohol and cocaine) can be more deadly than either drug alone.

Despite a popular myth, cocaine does not enhance performance on the job, in sports, at school, or with a sexual partner. Long-term use can lead to loss of concentration, irritability, loss of memory, paranoia (cocaine psychosis), loss of energy, anxiety, and a loss of interest in sex. Breaking a cocaine habit, which can cost an addict thousands of dollars a week, is not easy. How long and how difficult a task it may be varies from

person to person. Treatment can be costly, and the craving for cocaine may persist for long periods of time.

An alarming statistic that was first reported during the late 1980s and early 1990s was that at least 10% to 15% of infants born in public hospitals had been exposed to cocaine prenatally. While the effects of such exposure are controversial and may have been overestimated by both the press and the scientific community, cocaine-exposed neonates are frequently smaller and have smaller brains than normal babies, perhaps because they are more often born prematurely. The long-term consequences of exposure to cocaine in utero have not yet been fully determined.

—James B. Appel

See also Crack Baby Syndrome, Drug Abuse

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COCHLEAR IMPLANT

Hearing impairment is a common disorder, affecting many children and adults. Its severity varies widely among individuals. Mild loss of hearing sensitivity can almost always be treated effectively by acoustic hearing aids. These devices electronically amplify weak sounds to enable people with hearing loss to hear most sounds comfortably. However, sometimes the degree of impairment in both ears is so severe that no amount of amplification can restore adequate hearing sensitivity. At present, the cochlear implant is the only effective form of treatment when profound hearing impairment results from extensive loss or dysfunction of hair cells. Located in the inner ear (or cochlea), hair cells convert the mechanical vibrations of sound waves into electrical impulses, which travel along specialized nerve fibers to the brain, where hearing sensations are perceived. They are susceptible to permanent damage from various causes, such as infections, exposure to excessive levels of noise, and physical trauma.

Many types of cochlear implant have been developed and evaluated. All are based on the same functional principle: to replace the role of the hair cells by delivering electric stimuli directly to the auditory nerve fibers. The stimuli are small electric currents conducted through electrodes that are placed inside the cochlea during a surgical operation. Most commonly, the stimuli comprise brief pulses of current that produce nerve impulses similar to those resulting from hair cell activity in acoustic hearing.

In a normal cochlea, there are many thousands of hair cells and nerve fibers. Researchers have found that the structures of the cochlea are organized in a regular pattern, such that some nerve fibers respond best to sounds having high frequencies (or high pitch), whereas others are more responsive to lower frequency sounds. Therefore, modern cochlear implants have an array of multiple electrodes that are positioned to elicit hearing sensations that vary in pitch.

In addition to the electrode array, a miniature electronic device is surgically placed under the skin near the implanted ear. This device receives instructions transmitted from an external sound processor that controls how much current should be delivered by each electrode over time to evoke the intended sensations of hearing. Generally, the perceived loudness depends on the current level and the pitch depends on the location of the active electrode, as well as the rate at which the current pulses are presented.

The sound processor is usually worn on the external ear and has a similar appearance to a conventional hearing aid. Its transmitter is magnetically coupled to the implanted receiver so that information is conveyed across the intact skin. The implant also receives

electrical power via this coupling. Thus, the batteries required by the system are located in the external processor, where they may be replaced easily.

The processor picks up sound with a microphone that converts acoustic waves into electric signals. These signals are continuously analyzed by dividing them into separate frequency bands. Typically, the number of bands equals the number of implanted electrodes. The level in each frequency band controls the current level of the pulses delivered by the associated electrode. By this means, the frequency components comprising a complex sound are transformed into a corresponding pattern of electric nerve stimulation. Consequently, the cochlear implant user experiences hearing sensations that have variations of pitch and loudness related appropriately to the original sound.

The performance of cochlear implants has improved steadily since the earliest practical devices were developed in the 1970s. Much of the improvement is a product of progress in sound processor design. With the latest devices, most implant recipients can understand speech and recognize many other sounds, at least in favorable listening conditions. However, performance is poorer in situations with high levels of background noise, and perception of music is often unsatisfactory. Future advances will enable cochlear implants to provide better hearing of all types of sounds to people who obtain insufficient benefit from acoustic hearing aids.

—Hugh McDermott

See also Concrete Operational Period, Deafness

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COGNITIVE DEVELOPMENT

"New ideas come into this world somewhat like falling meteors, with a flash and an explosion and perhaps somebody's castle like roof perforated." This quotation by Henry David Thoreau aptly captures the burst of insight that occurs when an infant discovers the link between their internal and external worlds; when a preschool child suddenly masters the notion of symbols; when the school-aged child and adolescent approach problem solving with logic and flexibility; and when the adult supplants reasoning with wisdom. In essence, the quote captures the gist of cognitive development.

Table 1 Piaget's Stages of Cognitive Development

Stage 1.	Sensorimotor period (0–2 years)
Stage 2.	Preoperational period (2–7 years)
Stage 3.	Concrete operations period (7–11 years)
Stage 4.	Formal operations period (11–15 years)

For definitional purposes, cognitive development is the process of reasoning, thinking, and problem solving, which changes over the course of the life span.

The first section of this entry begins with a discussion of infant cognition, the second section continues with a focus on preschool cognitive development, the third section covers cognitive development in middle childhood and adolescence, the fourth section discusses adult thinking, and the entry concludes with the fifth section on contemporary issues in cognitive development and directions for the cognitive development in the 21st century.

The theoretical perspective responsible for shaping much of 20th-century discourse, thinking, and scholarship on cognitive development is that of the late Swiss scholar Jean Piaget. As a genetic epistemologist, he was keenly interested in understanding the origins of knowledge. He posited such questions as how does knowledge evolve? And where does knowledge come from? He viewed the acquisition of cognitive development as an active process, where the infant, child, and adolescent organize their experiences with their environment, adapt to their environment, and try to maintain a sense of balance with old and new knowledge. He believed that cognitive development occurred in discrete albeit connected stages encompassing the first 15 years of life. These stages were universal, invariant, and qualitatively different.

Piaget's theory serves as the framework for much of the discussion on cognitive development in this entry. Table 1 provides an overview of his stages of cognitive development.

COGNITIVE DEVELOPMENT DURING INFANCY

How do infants come to know their worlds? What rudimentary capabilities are present in infancy? Without the contribution of Jean Piaget, our knowledge of infant cognition would be limited to the behaviorist perspective, which asserts that learning or cognitive development occurs in a stimulus-response mode.

How then does cognitive development progress in infancy? According to the Piagetian perspective, infants "come to know" their world primarily through their senses and motor abilities. These rudimentary motor and sensory abilities lay the foundation for the more complex cognitive skills that will emerge during the latter half of the sensorimotor period and lay the foundation for the cognitive skills that will emerge during the subsequent stages of cognitive development.

This progression of infant cognitive development occurs through six substages of the child's first stage of cognitive development, referred to as the Sensorimotor Period. Table 2 provides an outline of the substages.

Table 2 Substages of the Sensorimotor Period

Substage 1.	Reflexes (0–1 month)
Substage 2.	Primary circular reactions (1–4 months)
Substage 3.	Secondary circular reactions (4–8 months)
Substage 4.	Coordination of secondary circular reactions (8–12 months)
Substage 5.	Tertiary circular reactions (12–18 months)
Substage 6.	Beginning of representational thought (18–24 months)

In substage 1 of the sensorimotor period, infants learn about their world through the use of their reflexes. Hence, the infant engages in the world, through sucking, reaching, and grasping. Eventually the use of these reflexes becomes more deliberate and purposeful as the infant progresses to substage 2 of the sensorimotor period. During these 3 months, the infant begins to actively involve his or her own body in some form of repeated activity. Thus the behavior is circular and primary because it centers on the infant's own body. It is not until substage 3, secondary circular reactions, that the infant begins to engage with objects in the environment. Initially, the contact with external objects (e.g., a crib mobile) is accidental, then with some planning and purpose subsequent contacts are deliberate. These contacts with the external objects become a repeated activity.

In due course, the infant will be able to combine these basic reflexes and use planning and coordination to achieve a particular goal, which is substage 4. For example, an infant sees a red ball under a chair in the living room. The infant crawls, reaches, and grasps the ball, thus coordinating both internal and external activities to achieve a planned goal.

In substage 5, the infant, now considered the "little scientist" begins an active exploration of its world, with a trial-and-error approach. Combining more mature motor behavior with increased planning and reasoning capabilities, the external world becomes the infant's laboratory.

The sensorimotor period culminates with substage 6 and the emergence of symbolic or representational thought. The toddler now has a basic understanding that objects can be used as symbols for other objects (e.g., a pillow can be used to represent a doll in play).

A critical attainment during the sensorimotor period is object permanence. Object permanence is the understanding that objects in our environment have a continued existence even though they may no longer be perceptually available. Piaget felt that infants did not fully master this ability until the substage 5 of the sensorimotor period.

There are other cognitive capabilities that begin to emerge during the first 2 years of life. Language is perhaps one of the greatest cognitive achievements.

Table 3 provides a brief summary of language acquisition during the first 4 years of life.

COGNITIVE DEVELOPMENT DURING THE PRESCHOOL YEARS

The preschool child has now entered Piaget's second stage of cognitive development, the preoperational period. This period heralds a new perception and understanding of the world, brought on by the attainments of the sensorimotor period.

One major attainment, the ability to engage in symbolic thought, allows the preschooler to participate in a variety of activities. These activities include understanding pictorial representations, engaging in pretend play, and mastering basic numeracy principles.

Understanding pictorial representations (i.e., knowledge that pictures are symbols of real objects) not only reflects the preschooler's evolving cognitive skills, but also permits the preschooler to engage in varying levels of sophisticated social interaction.

As an example, a child is looking through the family photo album with a parent and turns to a page with a picture of a grandparent; the child labels the person in the picture as grandpa. Thus, the preschool child has established that he is aware that the photograph represents a real person. Given their increasing vocabulary, and their developing pictorial representational ability, preschool children are now able to engage in a variety of learning interactions and activities with their parents.

When children engage in the various forms of pretend play, they are demonstrating their understanding of the multiple, flexible, and complex uses of symbols. For example, a child uses a block to represent a telephone, the child then speaks into the block and carries on a conversation (with another person); the child then hands the block to a playmate and persuades the playmate to engage in conversation with the block. Furthermore, there are elements of creativity present, as well as some rudimentary understanding of the social aspects of pretend play.

Even with the impressive achievement of symbolic thought, Piaget believed that preoperational children experienced some challenges in their thinking and reasoning capabilities, especially regarding issues of quantity. To assess this, Piaget administered his classic conservation of numbers task to the preschool children. The task involved presenting the children with two rows of pennies; one row was then spread out, and the children were asked if the rows contained the same number of pennies. The preschool children frequently stated that the longer row contained more pennies. Thus, Piaget concluded that the preschool children were unable to conserve quantity, and that their performance was due to their inability to focus on relevant aspects of the task (concentration), their inability to mentally reverse the operation (irreversibility), and their inability to understand the difference between transformations and static states. Piaget stated that in order for the preschool children to conserve numbers, they must understand that the two rows are still numerically equivalent despite the differences in the appearance of the rows.

Research by Rochelle Gelman has indicated that preschool children comprehend a great deal about numbers. She observed that preschool children possess two basic concepts about numeracy: number abstraction principles and numerical reasoning abilities. Number abstraction principles include an awareness of rules for counting, knowledge of number labels, and strategies for counting. Numerical reasoning abilities involve rudimentary knowledge of the rules for adding and subtracting quantity.

Table 3 Milestones in Language Development

Age	*Behavior*
1–4 months	Coos, makes vowel-like sounds
6 months	Coos, babbling of consonants and vowels
8–10 months	Babbling of two-syllable utterances, understands some words
12–18 months	Imitates sounds, understands simple commands; two-word utterances
24–30 months	Speaks 50 words or more; learning new words
36–48 months	Has a vocabulary of 1,000 words; language is well established

Memory and language skills and abilities show vast improvement during the preschool period. For example, preschool children have well-developed memories for everyday events that happen in their lives and can articulate those experiences (e.g., what happens when you go to McDonald's?). Language becomes less egocentric, and they are able to engage in various forms of social discourse. Vocabulary development continues, and individual differences in vocabulary and overall language competence emerge during this time period.

COGNITIVE DEVELOPMENT DURING MIDDLE CHILDHOOD AND ADOLESCENCE

The child in middle childhood has now entered Piaget's third stage of cognitive development, the concrete operations period. Unlike the preschool child, the concrete operations child has now acquired what Piaget referred to as mental operations. Mental operations are the ability to use logic when solving problems. This is evident in such Piagetian tasks as the conservation tasks. Thus, the major hallmark of this period is the ability to conserve not only quantity but other domains as well (e.g., liquid, mass).

The classic conservation tasks described in the previous section discussed the challenges that preschool children encounter with such an activity. Children in middle childhood possess the ability to decenter, to

comprehend transformations, and to engage in reversibility of thought.

In addition to these attainments, children in middle childhood are also able to engage in a variety of classification and categorization activities. That is, they can appreciate that objects and items belong to several categories. For example, preschool children and children in middle childhood are presented with the following classification problem. They are presented with a group of animals consisting of two collies, three great danes, five poodles, and six German shepherds. The children are asked the question, "Are there more German shepherds than dogs?" Preschool children would state there are more German shepherds. On the other hand, children in the concrete operations period would state that there are more dogs than German shepherds, because they are able to understand that shepherds belong to both a general category (dogs) and a subcategory (specific type of dog). This attainment as well as the others discussed below might well account for the interest that many school-aged children have in collecting objects (e.g., bugs) and classifying their classmates (e.g., ranking by looks, niceness).

Concrete operations children are also able to engage in the seriation of objects, which involves sequencing or ordering items according to such dimensions as height, color, size, or shape.

Language and memory abilities also improve during this time period. Vocabulary continues to build, and memory becomes a vehicle for learning. Their metacognitive skills, or their understanding of their memory and learning competencies, improve. Consequently, they are able to use their metacognitive knowledge to improve their learning of academic material.

The adolescent has entered Piaget's final stage of cognitive development, the formal operations period. The hallmark of this period is the ability to think abstractly. In contrast to the concrete operations child, the formal operations adolescent is able to use logic to solve problems, and these problems can be abstract rather than concrete in nature.

Also in contrast to the child in the concrete operations period, the formal operations adolescent can reason about such issues as spirituality, politics, and abortion. In addition to the ability to think abstractly, the formal operations adolescent can engage in what Piaget referred to as hypothetico-deductive reasoning. Hypothetico-deductive reasoning is the ability to generate hypotheses and systematically test each hypothesis. As an example, a formal operations adolescent wishes to obtain the family car, (e.g., I want to use the car tonight); he generates several hypotheses (e.g., I could ask mom, or I could ask dad); then he can mentally test the hypothesis (e.g., Now if I ask mom she might say no, so dad may be the more reasonable one to ask).

Formal operations adolescents can also envision and speculate about the future, and they can reflect on their own thinking. Thus, programs that encourage discussion of future plans and goals and decision making are often effective in facilitating the cognitive development of adolescents.

Language and memory skills show a dramatic improvement over the language and memory skills observed during the middle childhood period.

COGNITIVE DEVELOPMENT DURING ADULTHOOD

The formal operations period concludes Piaget's focus on cognitive development. While he acknowledged that cognitive growth and development continue throughout the life span, he felt that adult experiences were too diverse to capture characteristics that would encompass the universality of the experiences of all adults. Nevertheless, his conceptualization of cognitive development has influenced many theoretical perspectives on cognitive development in adulthood.

There is consensus from investigators who study cognitive development in adulthood that adults conceptualize problems differently from adolescents and shift from relying solely on logic to combining logic and "common sense" when reasoning about issues. Furthermore, there is acknowledgement by these researchers that the issues that adults are confronted with differ significantly from the more scientific and academic issues that adolescents have to deal with.

However, there is a great deal of variation in how researchers define adult cognitive development and a great deal of variation in the way in which they frame research questions about adult cognitive development. As a result, the focus on cognitive development in adulthood is multifaceted.

There are researchers who have put forth the idea that the Piagetian stages of cognitive development should be expanded to encompass adulthood. They have introduced the term *post–formal reasoning*. These scholars maintain that both the issues and patterns of reasoning in adulthood are qualitatively different from those of adolescence.

Post–formal reasoning could be classified into the following categories.

1. *Relativistic*: These adults reason with the acknowledgement that the "truth" is relative and that the implication of a situation is related to contextual issues.

2. *Dialectical*: These adults reason with the acknowledgement that the world is a dynamic and changing entity and that the interpretation of a situation should be considered in light of an unstable world.

3. *Problem Finding*: These adults reason with the goal of finding solutions to life's problems. There are many variants on the characteristics of post–formal reasoning, but this conceptualization captures the common assumptions among those who investigate post–formal reasoning in adults.

In contrast, there are researchers who have operationalized cognitive development as intelligence and investigated which aspects of intelligence remain the same from young adulthood to late adulthood and which aspects change over the life span.

The Cattell-Horn theory of crystallized and fluid abilities is a frequently cited example in the literature on aging and intellectual changes. According to these researchers, intellectual abilities can be classified into two general categories: crystallized and fluid abilities. Crystallized abilities are those abilities that are assessed by vocabulary and creativity subtests of IQ measures, and fluid abilities are those abilities that are assessed by timed reasoning, problem-solving, and math subtests of IQ measures. According to the theory, crystallized abilities increase or remain the same from young adulthood to late adulthood, whereas fluid abilities have been shown to decrease from young adulthood to late adulthood. Recently there has been some debate about whether fluid abilities do in fact decrease. A study conducted in the 1980s found that older adults could be trained to improve their performance on measures of fluid ability. Other research has demonstrated that noncognitive factors may contribute to the observed decline in fluid abilities rather than age per se.

Finally, there are researchers who have examined memory and explored how memory changes from young adulthood to late adulthood. Three aspects of memory have been explored by researchers in the psychological literature. These include episodic memory, which is a person's memory for personal events (e.g., what was your 5th birthday party like?); semantic memory, a person's memory for world information (e.g., what is the capital of France, meanings of words); and cognitive resources (e.g., short-term memory) and noncognitive factors (e.g., health).

Based on findings from the literature, age comparisons suggest that younger people for the most part have better episodic memories than do older adults. On the other hand, there are few age differences in semantic memory, with the exception that younger adults are faster in retrieving semantic information than are older people. There is some evidence to suggest that working memory declines in late adulthood. That is, older adults experience some challenges in retrieving information from working memory. Lastly, such noncognitive factors as health (older people in poor health experience problems with memory) influence the memory performance of older adults.

The general agreement is that there is a great deal of individual variation in adulthood cognitive development. If declines are present, age is sometimes not the sole contributing factor. There is some truth to the saying "Use it or lose it!!"

CONTEMPORARY ISSUES IN COGNITIVE DEVELOPMENT ACROSS THE LIFE SPAN

During the latter half of the 20th century, cognitive developmental psychologists turned their attention to investigating the following issues and questions.

What is the relationship between brain development and cognitive development? On the one hand, the specific focus has been to identify how brain changes (e.g., structure, function) influence language and other cognitive capabilities. On the other hand, researchers are beginning to explore and specify the brain changes that contribute to intellectual decline in old age. During the 21st century this area has been a hot topic for researchers in cognitive development.

In addition to the focus on brain changes and cognitive development, researchers are continuing to explore the role of social influences on cognitive development. The works of the late Russian theorist Lev Semonvich Vygotsky have contributed to this interest. Researchers are particularly concerned with investigating how social and cultural influences shape cognitive development early in life and how social and cultural influences have a continued effect on cognitive development throughout the life span.

Theory of the mind reemerged in the latter half of the 20th century and the beginning of the 21st century as a topic of interest for cognitive developmentalists.

Such questions as how do children understand the intentions of others and how do children develop an understanding of the critical aspects of human thinking and behavior have occupied a central focus in the area of social cognition in the past decade.

Finally, the area of eyewitness testimony continues to have a prominent place in the field of cognitive development in the 21st century. Researchers are exploring ways to reduce the influence of interviewer suggestibility on eyewitness testimony and to increase the accuracy of eyewitness testimony of both adults and young children.

—Yvette R. Harris

See also Abstract Reasoning, Accommodation, Assimilation, Conservation, Formal Operational Period

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COGNITIVE DISSONANCE

Cognitive dissonance refers to the psychological discomfort that people experience when there is inconsistency between their knowledge or beliefs and their behavior. Dissonance is distressing because humans strive to be consistent within themselves. A major category of cognitive dissonance is known as postdecision dissonance. This refers to the distress that occurs after one makes a decision.

Whenever individuals decide between a set of desirable alternatives, their decision will result in dissonance. For example, imagine that a person is considering job offers from company A and company B. Both positions have several positive features that make each of them uniquely appealing. After much consideration, the person selects job A but then immediately begins to wonder if it was the correct decision. This postdecision dissonance occurs because the person knew that job B had many attractive features and yet did not choose it; therefore, the decision is inconsistent with some of the person's beliefs about the characteristics of an ideal job.

Different decisions are associated with varying levels of dissonance. How strongly the postdecision dissonance is felt depends on the importance of the decision, the attractiveness of each decision option, and the amount of similarity between the alternatives. Decisions of higher importance result in stronger dissonance. Therefore, a decision about which home to buy will result in greater dissonance than deciding what to eat for dinner.

Likewise, the more attractive an unchosen alternative is, the stronger the dissonance will be. Returning to the example of job offers, as the number of positive qualities of job B increase, so does the number of factors that are inconsistent with a decision to reject the job. The magnitude of the dissonance is decreased because there is more overlap between the different choices. Dissonance is caused by inconsistency, and because similar alternatives are highly consistent with each other, they will result in less dissonance.

The presence of dissonance results in a motivation to reduce it. There are three ways that postdecision dissonance can be alleviated. First, one can change or revoke the decision. Changing the decision may provide brief relief but will ultimately result in dissonance again because one is simply switching the elements that are consistent and inconsistent. Psychologically revoking the decision can be an effective means of reducing dissonance. One way this is achieved is by admitting that one made the wrong decision. Another tactic is to convince oneself that it was not a free decision. By believing that the decision was applied from the outside

instead of through personal choice, the person has not engaged in any inconsistent behavior. A second way to reduce postdecision dissonance is to change one's cognition about the alternatives. This can be achieved by adding to the consistent characteristics of the chosen alternative or by adding to the inconsistent characteristics of the alternative that was not chosen. One could also focus on reducing the inconsistent characteristics of the chosen alternative or reducing the consistent characteristics of the unchosen alternative. Finally, cognitive dissonance can be reduced by creating cognitive overlap between the alternatives. By picking aspects of each alternative and applying them so that they will lead to the same result, one can eliminate the inconsistency.

Cognitive dissonance is an unavoidable side effect of decision making. Depending on the characteristics of the alternatives, the strength of the dissonance will vary. Because the experience of cognitive dissonance is unpleasant, individuals will try to reduce the dissonance by changing their thoughts about the possible choices. This is done by increasing the attractiveness of their selection, decreasing the attractiveness of the other alternatives, creating overlap between the alternatives, or psychologically revoking the decision.

—Alicia Ito Ford

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COGNITIVE EQUILIBRIUM

Cognitive equilibrium refers to a state of balance between an individual's mental schemata, or frameworks, and his or her environment. Such balance occurs when our expectations, based on prior knowledge, fit with new knowledge. Swiss psychologist Jean Piaget (1896–1980) developed the concept of equilibrium to describe one of four critical factors in cognitive development, along with maturation, physical environment, and social interaction. Piaget described equilibration as an ongoing process intended to refine and transform mental structures, which is the basis of cognitive development. More equilibration action tends to occur as an individual is transitioning from one major developmental stage to the next.

Equilibration also explains individuals' motivation for development. Individuals naturally seek equilibrium because disequilibrium, which is a mismatch between one's way of thinking and one's environment, is inherently dissatisfying. When individuals encounter new, discrepant information, they enter into a state of disequilibrium. In order to return to a state of equilibrium, individuals can ignore the information or attempt to manage it. One option for managing discrepant information is called assimilation, and the other option is called accommodation.

Assimilation is the process of modifying discrepant information so that it matches current schemata. For example, a child visiting a petting zoo may encounter a pony for the first time. The child recognizes some of the features of the animal, so the "dog" schema is activated and the child says, "Dog!" As a second example, a student who knows that the area of a rectangle can be calculated by multiplying the length by the width may attempt to calculate the area of a triangle by multiplying two sides together. In each example, individuals' assimilations lead to error; however, errors do not always follow assimilations. If the child said, "Dog!" upon seeing a poodle for the first time, or if the student applied the formula for the area of a rectangle in order to calculate the area of a parallelogram, they would be assimilating the new information without error. Erroneous or not, assimilation does not produce cognitive change (which Piaget considers the source of development) because the schemata are unchanged.

Cognitive change, and thus cognitive development, can only be achieved through accommodation. Accommodation is the process of modifying current schemata so that it matches discrepant information. For instance, in the previous example of the child at the petting zoo, the child's caretaker might have said, "No, that's not a dog; that's a pony." In this case, the child's old schema did not work so the child must reevaluate the "dog" schema. To do so, the child must determine whether the "dog" and "pony" schemata might both fall under a larger "four-legged animal" schema, whether they can both exist separately from each other, and which characteristics differentiate two animals. The child's slightly modified "four-legged animal" schema is now less vulnerable to disequilibrium due to discrepant information and is therefore more stable.

While cognitive equilibration is an ongoing process that utilizes the dual processes of assimilation and accommodation, there are certain instances when one of the equilibration processes is more likely to occur than the other. Accommodation is more likely to occur when new information only slightly diverges from current schemata and when an individual is transitioning from one developmental stage to the next. Assimilation is more likely to occur when new information is vastly divergent from current schemata and as a precursor to accommodation. When new information matches existing schemata exactly, the individual remains in a state of equilibrium. It is this state of equilibrium that creates the basis for the disequilibrium and accommodation that propels individuals to subsequent developmental stages and higher levels of adaptability.

—Anne S. Beauchamp

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COGNITIVE STYLE

Predicting school achievement as well as traditional psychometric measurements of intellectual abilities, cognitive styles are not abilities themselves but rather preferred ways of applying the abilities one has. Typically, *cognitive styles* refers to the manner in which individuals receive, process, and apply information. Unlike individual differences in abilities that often are arranged by descriptions of peak performance, styles describe a person's typical mode of thinking, remembering, and problem solving. Furthermore, styles are theorized as bipolar dimensions, whereas abilities are unipolar (ranging from zero to a maximum value). Having more of a particular ability is usually considered beneficial, while having a particular cognitive style simply designates a tendency for one to behave in a certain manner. Cognitive style is usually described as a personality dimension that influences attitudes, values, and social interaction. Cognitive styles dominate the preferences for how people process information, and while many paradigms have been hypothesized, two basic dimensions appear most readily in the research literature: holistic/analytic and verbal/imagery. The former encompasses a tendency to organize and rearrange information into categorical segments of "wholes" and "parts." The latter embraces a tendency to represent information verbally and/or through mental images. Cognitive style is an independent construct or psychological schema that is not apparently related to intelligence, personality, and gender. As such, it is an important component of individual differences and has profound implications for accommodations in educational and workplace arenas. It is related to a range of behaviors, including learning performance, social responses, and occupational stress. Cognitive style appears to be fairly fixed, with a probable physiologic basis and, as such, is distinct from learning strategies that can be taught and acquired through instruction. A collection of cognitive styles has been isolated and examined over the past few decades, starting with the cognitive styles movement in the 1950s and 1960s. Among the most well-known cognitive styles are those related to handling one's environment: field independence versus field dependence. This bipolar cognitive style refers to a tendency to approach the environment in either an analytical or a global fashion. At a perceptual level, field-independent personalities are able to distinguish figures as discrete from their backgrounds compared with field-dependent individuals, who experience events in an undifferentiated way. Field-dependent individuals have a greater social orientation relative to field-independent personalities. Several studies have identified a number of connections between this cognitive style and learning. For example, field-independent individuals are likely to learn more effectively under conditions of intrinsic motivation (e.g., self-study) and are influenced less by social reinforcement. Another well-known cognitive style related to the way people tend to approach and handle tasks is that of impulsivity versus reflectivity. An impulsive student works fairly quickly but makes many mistakes. In contrast, a reflective student works much more slowly but with much greater accuracy. Similar to the field independence–field dependence cognitive style, impulsive and reflective cognitive styles are not substantially related to intelligence

within the normal range. Some studies of the impulsivity-reflectivity cognitive style found that this style is stable over time and tasks, whereas other studies found that, as children progress through school, they generally become more reflective, and as a result, their academic performance may improve. Several other cognitive styles have been proposed, which are only listed here: equivalence range, category width, compartmentalization, conceptual integration, tolerance for unrealistic experiences, and scanning. It is generally agreed that accepting the concept of cognitive style has implications for how we view the teaching and learning process. With the dramatic changes in the means of communication (e.g., an increasing and widespread use of electronic media), educators need to adjust the means of providing service to students. These adjustments need to take into account students' preferred cognitive styles to maximize and optimize learning for all students.

—Lilia M. Ruban and F. Richard Olenchak

See also Locus of Control

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COHABITATION

The trends in romantic relationships have been changing dramatically over the past few decades in the United States. Divorce rates increased steadily over the past 40 years and are finally leveling off at just less than 50%; marriage rates have similarly declined, with the average age of first marriage increasing; and the number of cohabiting couples has increased sharply. Census data from 2000 indicated that 5.5 million households (4.9 million different-sex couples and 0.6 million same-sex couples) identify themselves as unmarried relationship partners living together, representing more than 5% of all households in the United States. Although this arrangement may seem to represent a small proportion of households in the United States, the number of cohabiting couples has increased 1,000% since 1960 (while the general population increased by around 60%). More than 40% of women have lived with a romantic partner without marriage at some point in their lives, and the majority of married couples today lived together before marriage.

WHO COHABITS?

Cohabiting couples tend to be younger, more likely to be employed, and more racially diverse than married couples living together. Relationships between partners of a different race are uncommon for both unmarried and married partners living together, but this arrangement represents about twice as many cohabiting households as married households. People who enter cohabiting relationships are more likely to be in college, have divorced parents, and have parents with higher education than those who do not enter cohabiting relationships. Frequent religious attendance is a negative correlate of cohabitation. Finally, cohabiting couples are slightly less likely than married couples to have children younger than 18 living in their household.

Similar to the general population distribution, cohabiting couples are much more likely to live in or near an urban area than a nonmetropolitan area, with nearly 60% of cohabiting couples living in the Southern and Western United States. Alaska has the highest proportion of cohabiting couples of the 50 states (primarily due to the high Native American population in the state), with San Francisco, California, and Fort Lauderdale, Florida, having the greatest proportion of cohabiting couples among major U.S. cities.

FACTORS AFFECTING COHABITATION TRENDS

On an individual level, people cohabit for a number of reasons. Cohabitation may make the most financial sense for a dating couple strapped to pay for separate

living arrangements. Cohabitation may be a matter of convenience for couples. Cohabitation may serve as a trial marriage for couples and allow for easier dissolution if the relationship ends. Cohabitation may be an alternative to marriage for couples that do not believe a more formal arrangement is necessary or optimal. Finally, unmarried cohabitation is the only option for homosexual couples in many states although gay couples in Massachusetts, parts of Canada, and some European countries can be legally married. But it is yet unclear as to who can fully enter into a legal married union. These reasons, though, do not address the growing trend of cohabitation.

Although it is difficult to point to any one factor causing the societal boom in cohabitation, the improved status of women certainly plays a role. Before the 1960s, few women in the United States worked outside of the home and marriage was the primary means of economic subsistence for women. Today, 95% of women will work outside of the home at some point in their lives, 60% of women at any given time are working for pay, and nearly 60% of college entrants are women. Marriage is no longer the only option for financial security for women (and their children). Further easing the pressure toward marriage for women is the availability of reliable contraception and the subsequent demise of the "shotgun" marriage. Cohabitation may be seen as a comparable alternative to marriage for women who do not need the security that a more formal union may have provided in the past. Cohabitation may also be seen as an acceptable precursor to marriage while one finishes school or establishes a career.

Another explanation for the increase in cohabitation and decrease in marriage is that the social mandate for marriage has weakened. In 1950, 67% of men and women over 15 were married; in 2002, only 55% of men and women over 15 were married—and this percentage typically reflects an older segment of the population. Only 7% of American households represent the "traditional" family of a married heterosexual couple with children.

There is a general sense among adult men and women that marriage is not necessarily the culmination of a long-term dating relationship. Religious doctrine has been the long-standing force against unmarried cohabitation (primarily due to sanctions against sex outside of marriage). As attitudes in the United States shift toward greater adherence to individual desires than religious teachings, attitudes toward premarital sex and cohabitation have become more permissive. Fifty percent of college students say that they would live with a romantic partner under the right circumstances (and 25% already do).

COHABITATION AND CULTURE

Attitudes about cohabitation have varied greatly over time and across cultures. Today, trends similar to those in the United States can be seen in other industrialized nations. Cohabiting couples represent about 7% of households in the Netherlands, 13% of households in France, and 25% of households in Sweden. Relationships in Sweden may have moved the farthest of any industrialized nation from the "traditional" nuclear family (with 55% of 25- to 34-year-olds cohabiting). However, cohabitation may have different meanings in these European countries. In Northern European countries, cohabitation may represent an alternative to marriage, whereas cohabitation is more likely to act as a precursor to marriage in Western Europe. In Southern Europe and Ireland, cohabitation is much rarer than in other areas of Europe.

Although the cohabitation trend is more noticeable in industrialized nations than in the developing world, there are some notable exceptions. Economically, Japan is very similar to Western industrialized nations, but cultural differences (e.g., importance of the traditional family) translate into different practices as far as marriage and cohabitation are concerned. Although noting similar increases in divorce and later marriage as many Western countries, Japan has not had a comparable increase in cohabitation, with less than 2% of households in Japan made up of cohabiting couples.

In the developing world, cohabitation rates vary greatly depending on cultural norms. In Latin America and the Caribbean, where cohabitation is more normative, 54% of women are in unmarried cohabiting partnerships. However, in Arab cultures, societal and religious norms strongly sanction any type of relationship that suggests premarital sex. Similarly, in South Asia, cohabitation is very rare and trends do not seem to mirror those in Western cultures.

The impact of culture is notable even within the United States. More than 17% of Native American households are cohabiting couples compared with 4.6% of Latino households, 4.1% of Black households, 3.6% of White households, and 3.1% of Asian American households.

RELATIONSHIP SATISFACTION, MARRIAGE, AND DIVORCE

Changing trends in an institution as ingrained as marriage lead to questions about the quality of cohabiting relationships. For years, well-meaning parents have warned their children against the evils of cohabitation, citing the oft-reported finding that people who cohabited (not necessarily with their eventual marriage partner) were 50% more likely to get a divorce than noncohabitors. The problem with this correlation is that it is often misrepresented as a causal association. People with nontraditional attitudes are more likely to cohabit and more likely to have permissive attitudes about divorce. Furthermore, research has shown that cohabitation changes a person's attitudes in favor of nontraditionalism, so it is not cohabitation but rather the more favorable attitudes toward divorce that lead to divorce. Suggestions that people who enter into cohabiting relationships are simply less likely to be successful at relationships in general have not been supported by research.

Fifty percent of different-sex cohabitors get married within 5 years of moving in together, 40% break up within 5 years, and around 10% remain in unmarried relationships for more than 5 years. The difference in relationship satisfaction between cohabitors who plan to marry and those who do not is significant, with those who plan to marry having greater relationship satisfaction than those who do not plan to marry and having essentially the same relationship satisfaction as those who are married. Those who cohabit and go on to marry their cohabitation partner have marriages that are of comparable length to those who do not cohabit before marriage. It is important to note that cohabitors are no less likely to get married than noncohabitors. They are just not necessarily going to marry the person with whom they currently live.

Cohabiting couples who do not officially marry sometimes enter into a common law marriage (by choice or circumstance). Formally recognizing cohabiting relationships has been common practice for hundreds of years. In pioneer times, when formal marriage was precluded by poverty or an unavailable officiant, the idea of common law marriage was born. Fifteen states currently recognize common law marriages (although a number of states specifically outlaw common law marriages). Common law marriages are usually defined by a couple's prolonged cohabitation and presentation of themselves to others as a married couple. Common law marriage typically affords a couple all of the rights of marriage (including necessitating a divorce upon dissolution). It should also be noted that, although rarely enforced, seven states currently outlaw cohabitation of unmarried relationship partners.

SUMMARY

As relationship freedom expands for men and women and the stigmas against cohabitation break down, more couples are opting to enter into unmarried cohabiting relationships. Cohabitation allows many of the once exclusive perks of marriage—convenience, increased time spent together, legitimized sex, financial savings—to couples who are not ready for, interested in, or are barred from marriage.

—Renae Franiuk

See also Common Law Marriage

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COHORT

A cohort refers to a group of individuals who have common characteristics such as age, experience, location, or generation. Historically, the term was used to describe a Roman military unit. Currently, the term is used more loosely, and the grouping characteristics of a cohort can be quite varied. The most typical type of cohort in developmental psychology is referred to as an age cohort or birth cohort and can include either a particular year of birth (e.g., 1990) or a span of years such as the "baby boomer" or "generation X" generations. These age or birth cohorts are likely to share common cultural, historical, and social influences. However, time of birth is not the only grouping characteristic of a cohort. Other types of cohorts include groups of individuals who have experienced a significant life occurrence such as 9/11 or a group of individuals who started medical school at the same time. Overall, cohorts are of concern in many areas of research other than developmental psychology, such as economics, health, and sociology, and are also of concern to demographers.

In developmental psychology, cohorts represent a methodological concern because age and cohort can be confounding variables. Thus, in many studies there is a risk of a cohort effect. A cohort effect occurs when the results are affected by the particular cohorts used in the study rather than representing true age effects. For example, in life span studies of intelligence, age and cohort are often confounded because older adults are typically less educated than younger adults, so although differences in intelligence are found across the life span, these differences do not reflect true age-related effects. In general, most developmental studies use the traditional cross-sectional or longitudinal designs, and both of these designs are susceptible to cohort effects. In the cross-sectional design, groups of different ages are included, but differences that are seemingly age related may in fact be due to unique experiences to one or more of the age, or cohort, groups. For example, in a study of reading development in 6-, 8-, and 10-year-olds, a new reading curriculum may have been implemented just as the 6-year-old group started school, and therefore their reading scores are as high as those of the 8-year-old group. It would then be erroneous to conclude that there are no age-related changes in reading development between the ages of 6 and 8 because a cohort effect may have occurred. In the longitudinal design, data are collected from one group across time, but that group may have had unique experiences such that conclusions from the study are not generalizable. In an ongoing study of computer literacy, for example, the study began in 1980 with a group of 10-year-olds tested at regular intervals. This study would yield data on 20-year-olds from 1990 that would not necessarily be reflective of the typical computer literacy of individuals who turned 20 in 2004. Once again, a cohort effect may have occurred because the data from the study are not applicable to the present day.

To control for effects of cohorts, several research designs are available, but the issue of which design is most appropriate in developmental psychology is contentious. Sequential designs are a common type of research design used to control for cohort effects. In sequential designs, a combination of cross-sectional and/or longitudinal designs is used. The cohort-sequential design utilizes two longitudinal designs with data collection starting at two different times. The time-sequential design utilizes two cross-sectional designs with data collection at two different times. The cross-sequential design utilizes a longitudinal and cross-sectional design that includes groups of different ages that are followed longitudinally. All of these designs can be used to try to control for cohort effects.

—Katherine M. Robinson

See also Longitudinal Research

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COLIC

Colic and *colicky* apply to crying behaviors in otherwise healthy infants who, despite their caregivers' attempts at soothing, cry inconsolably. Colic has been defined as inconsolable or excessive infant crying for which no physical cause can be found and which lasts a minimum of 3 hours of total crying per day, at least 3 days a week, for at least 3 weeks throughout the infant's first 3 months of life [Wessel's Rule of Three (1954)]. The incidence of infant colic, thus defined, is estimated to affect approximately 20% of infants. Colic is an anomaly, not a disease that can be cured. Infant crying is a universal phenomenon. It begins shortly after birth and increases thereafter with the peak amount of crying occurring at about 4 to 6 weeks of age. Crying then decreases in amount until about 3 months of age. It has been reported that all infants during this time cry an average of 2¾ hours per day, with colicky infants crying considerably longer.

Colic has been thought to be a problem originating in the gastrointestinal (GI) tract of infants, resulting in flatulence or "gas," cramping, or intestinal pain. Little, if any, scientific evidence supports this connection. In addition to similarities in GI function, research comparing colicky infants with normally crying infants has shown no differences in sex distribution, birth order or parity, birth weight or weight gain, feeding practices (breast, bottle, or mixed feeding), infant allergies or eczema, or family history of allergy. There also has been little evidence of related factors such as maternal age or education or maternal illness during pregnancy. Some evidence supports an association of colic with maternal emotional state or family tension. However, these studies were done retrospectively after parents' experiences with their colicky infants, making it difficult to determine the direction of causality. It is possible that the increased anxiety and/or family tension was the result not the cause of the colic. Some evidence exists that colic may run in families.

Research on infant crying has shown similarities between normal crying and colic. First, both colicky and normally crying infants appear healthy with no physical cause for their crying. Second, both normal crying and colic show the same diurnal pattern, that is, most crying occurs during the evening. While crying bouts can occur at any time during the day, they seem to be most common during the later hours of the day. Third, both normal crying and colic show the same developmental course over weeks.

Colic most often has its onset during the 2nd or 3rd week of life, with the severity of symptoms and the proportion of infants reported as colicky increasing until the 2nd month of life and decreasing thereafter. Inconsolable crying usually ends at 9 to 16 weeks of age. In populations of normal criers, a similar developmental course of increase and subsequent decline in amount of crying has also been reported. Hence, normal crying and colic differ from each other quantitatively but not qualitatively.

There is no cure for colic. However, colic will usually resolve on its own by about 3 to 5 months of age. In the meantime, colic can be managed by soothing techniques that have proven helpful. These include swaddling, non-nutritive sucking (pacifiers), auditory stimulation, and rocking. All four classes of soothers can be provided simultaneously to the infant who is carried by and in close contact with his or her caregiver. Experimental research has shown that combinations of these soothers are more effective in calming crying infants than a single soothing technique used alone. Infant massage has been shown to be no more effective than other soothing techniques such as carrying, but when used in combination with supplemental carrying, for example, has proven helpful.

Caregivers need to remind themselves that they are not the cause of their infant's colic. First, changing feeding methods has not helped to reduce the colic. Since colic is not indigestion, stopping breast-feeding does not necessarily reduce the colic nor does changing formulas or offering solid foods. A number of herbal or nonprescription remedies exist that are unlikely to reduce the colic and which may even be harmful to the infant.

Because of the challenges presented by a colicky infant, caregivers need respite time in order to attend to their own sleep and social needs. They also need reassurance that this difficult and frustrating time coping with their infant's colic will improve with the passage of time when they will enjoy their happier infant.

—M. Ruth Elliott

See also Infancy

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COMMON LAW MARRIAGE

Common law marriage is a form of marriage that is recognized without legal and civil formalities such as a marriage license or a ceremony and includes all of the rights, privileges, and duties of formal marriage. This form of marriage was an important recognition of rights for early settlers in the United States, where access to "legal" marriage was limited simply by the distances one would have to travel to be formally married by a member of the clergy or state official. However, the legal concept of common law marriage in the 20th century has almost completely died out through legislative changes and the relative ease of getting married in our increasingly mobile society. It is a legal concept entirely created in law and is generally determined by a court of law and rarely defined by statute. Only a handful of states still recognize it as a valid form of marriage. The reasons for abolishment of the recognition of common law marriage in most states range from religious beliefs to beliefs by legislatures that the recognition was no longer necessary.

Common law marriage has its roots, like so much of American law, in English law. It began as a type of marriage entered into *sponsalia per verba de praesenti* (by present words and not ceremony) in ecclesiastical law. Common law marriage in England could be accomplished in two ways, as above, through mutual assent in words of the present tense, or through mutual assent to marriage in the future, followed by sexual intercourse (*sponsalia per verba de futuro cum copula*). Common law marriage continued in England until the passage of Lord Hardwicke's Act in 1753, which enacted certain formal requirements essential for recognition of a valid marriage. The institution of common law marriage followed the first English and European settlers to America.

The most common myth concerning common law marriage is that a couple has to live together for 7 years. Common law marriage has no requirement of living together for a certain number of years. The specific requirements for a valid common law marriage vary from state to state. In Kansas, for example, there are three requirements: (1) that the parties have the capacity to marry; (2) that the parties hold out each other to the public as husband and wife; and (3) that the parties have a present agreement between them to be married. Other states that recognize common law marriage have similar requirements.

While legal definitions differ from state to state, capacity to marry includes having the requisite mental or physical capacity to marry, not already being married to someone else, not being too closely related to the person, and being of a sufficient age to marry.

Evidence of many different activities can constitute holding out to the public as husband and wife. These activities can include living together, using the same last name, having joint bank accounts, filing joint tax returns, owning property jointly, introducing each other as husband and wife to friends, family, or the public, and many other marital behaviors.

Determining whether a present agreement to be married exists is the most difficult of the requirements for common law marriage to prove. The manifestations of someone in a relationship and the interpretation of those manifestations is what creates the difficulty in discovering if the parties had a present agreement to be married. Generally, consent to cohabit or a promise to get married in the future does not establish a sufficient present agreement to be married. Some courts have allowed the agreement to be married to be implied from the couple's actions and circumstances. This fact-intensive analysis is what makes analyzing common law marriage cases difficult.

There is no statutory common law divorce. The parties, once they have entered into a valid common law marriage, generally must go through divorce or annulment as dictated by state statute. However, no analysis of the above requirements comes into the courts until

there is an issue between parties arising in contexts as varied as intestacy or probate, divorce, marital privilege, criminal prosecution, worker's compensation, or termination of alimony.

—Elizabeth M. Myers

See also Marriage

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COMORBIDITY

A disorder reflects a set of symptoms (mental or physical) that causes significant impairment or distress. Comorbidity is the simultaneous presence of two or more disorders within a person. For example, a person diagnosed with generalized anxiety disorder and major depressive disorder may experience symptoms of the former condition, such as chronic, uncontrollable worry, as well as symptoms of the latter condition, such as negative mood or thoughts of suicide. Comorbidity is common among people seeking mental health services, and it increases the risk for more severe symptom development if left untreated. Accordingly, an understanding of the causes and consequences of comorbidity is recognized by mental health clinicians and researchers as critical to the classification, development, diagnosis, and treatment of mental disorders.

Comorbidity can often be a product of how disorders are classified. For example, a classification system that splits symptoms into a greater number of diagnostic groups is likely to produce increased comorbidity estimates, whereas a classification system that lumps symptoms into a fewer number of diagnostic groups is likely to produce decreased comorbidity estimates (but as a result may miss important distinctions). Furthermore, the more symptoms two disorders have in common, the more likely it is that both disorders will be diagnosed.

When comorbidity is present in an individual, researchers and clinicians distinguish between primary disorders and secondary disorders. The primary disorder is the disorder that is most severe and debilitating, and the other disorders are secondary comorbid disorders. Therefore, the rate of comorbidity between two disorders depends on which disorder is considered to be primary. This distinction is important because it may form the basis for treatment recommendations. For example, an individual who has a primary anxiety disorder and secondary major depressive disorder may benefit more from treatments that reduce anxiety symptoms than those that reduce symptoms of depression. Finally, in some classification systems, such as the *Diagnostic and Statistical Manual for Mental Disorders* (*DSM*), a diagnosis cannot be assigned when symptoms do not meet criteria for a given disorder. It has been argued that much potentially useful information about symptom comorbidity is lost by disregarding additional symptoms that do not meet criteria for a comorbid disorder. However, the current system helps ensure that diagnoses are only assigned when sufficient symptoms are present to indicate a disorder.

The study of comorbidity may also provide information about processes that give rise to different mental disorders. This is the case with certain disorders that are associated with increased risk for the development of other disorders. Disorders A and B may be highly comorbid, such that people with disorder A are at increased risk for the development of disorder B, and vice versa. This pattern of comorbidity may reflect a shared genetic or psychological vulnerability between the disorders. However, many alternative explanations would need to be ruled out before one could conclude that a single vulnerability causes disorders A and B. For example, the comorbidity may be due solely to a greater tendency in individuals with both disorders to seek treatment than in individuals with only one of the two disorders.

Finally, comorbidity is an essential concept in treatment. Compared with individuals who have only one disorder, individuals with comorbidity have poorer overall functioning and poorer response to a variety of treatments. As a result, comorbidity is an important consideration when clinicians are planning treatment. Because most available treatments are designed to treat a single disorder, clinicians may focus on treating the symptoms of the primary disorder while addressing comorbid disorders indirectly. For example, clinicians may try to improve treatment

response by targeting symptoms common to both disorders, which may share a common cause.

Much remains to be learned about comorbidity. A better understanding of the specific ways in which different approaches to classification, such as splitting or lumping symptoms into diagnostic categories, influence comorbidity will be crucial to future revisions of widely used diagnostic manuals. In addition, research is needed to clarify the complex relationships between basic developmental processes and comorbidity. Finally, the study of comorbidity may inform the development of new treatments that directly target the occurrence of multiple disorders.

—Frank J. Farach and Douglas S. Mennin

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COMPETENCE VERSUS PERFORMANCE

The concept of competence versus performance is fundamental to the study of language. This distinction recognizes that the "mistakes" people make when speaking (performance) may not accurately reflect what they actually know (competence). We all have made "slips of the tongue," where we substitute a word or sound for another or use a different grammatical form than intended, with sometimes humorous results. For example, you might say you need to go "shake a tower" instead of "take a shower," ask someone to be "pacific" rather than be "specific," or accuse someone of telling a "lack of pies" rather than "pack of lies." Performance errors can also be found in comprehension, such as mishearing "just a position" for "juxtaposition." These kinds of mistakes do not mean that we have an inaccurate knowledge of language. Rather, a variety of conditions, both internal to the individual (i.e., memory limitations or fatigue) and external (i.e., distractions or interruptions) can cause a difference between what people know about their language and how they apply that knowledge in real situations.

Noam Chomsky defined competence as the underlying knowledge each speaker-hearer has about the language of his or her community. As such, competence is an ideal, which presupposes a "completely homogeneous speech-community." It is hypothesized as a psychological or mental property or function and therefore cannot be directly observed. In contrast, performance refers to an actual communicative act of speaking or hearing. In this distinction, performance is an incomplete and inaccurate demonstration of what an individual knows about his or her language.

The competence-performance distinction is an important one in linguistics. One of the major goals of linguistic research is to discover how children develop language. Another is to understand how language functions within the human brain. One difficulty in conducting these types of language research is that actual speech contains errors. In 1965, Noam Chomsky argued that the focus of linguistic theory must be on the underlying language system (competence), not the act of speaking (performance). While performance errors may illuminate how language is perceived and organized in the brain, the goal of a theory of language is not a description of what people actually say. Rather, it is to describe the cognitive mechanism by which humans can produce an infinite number of sentences, many of which they have never heard, from a finite number of words and grammatical structures. Therefore, it is crucial to differentiate between competence and performance.

Chomsky's distinction between competence and performance has undergone some criticism, such as for the emphasis on grammar in his definition of competence. Subsequently, Dell Hymes and others have introduced the concept of "communicative competence," which refers to an individual's knowledge of how to use language appropriately in different social and communicative contexts. The focus on language use has emerged in recent years in a variety of areas, including language socialization research. This type of study examines how children from different backgrounds are socialized to use language in culturally appropriate ways and how they develop understanding of the social organization

and worldview of their cultural group through the development of their community's language.

The distinction between competence and performance remains important to many areas of study (i.e., artificial intelligence and second language acquisition) and is widely applied. Nonetheless, as with the theory of language for which this distinction was originally proposed, many questions and controversies remain. Yet, for many, this is a useful heuristic device that allows us to consider and explain how in terms of our language abilities, as in many other areas of human cognition, we may know more than we can demonstrate through our actions in daily life.

—Julia Scherba de Valenzuela

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CONCRETE OPERATIONAL PERIOD

The concrete operational period is the third period in Jean Piaget's theory of cognitive development. Piagetian periods occur in invariant order. Thus, a child must pass through the sensorimotor and preoperational periods before entering the concrete operational period and must pass through the concrete operational period before entering the formal operational period. Although exact ages of acquisition are not central to Piaget's theory, he proposed that children in the concrete operational period are between the ages of 6 and 12. Contemporary research has found that both younger and older individuals may engage in thought that is characteristic of the concrete operational period.

Each Piagetian period is characterized by qualitative changes in the nature of children's thought. Entry into the period of concrete operations is marked by the child's mastery of operations. Operations can be defined as the mental representation of transformations. Using operations, children in the concrete operational period are able to reason logically about real situations. Children in this period are still unable to reason logically about hypothetical situations or to reflect upon their own thoughts.

Entry into Piagetian periods is marked by success on Piagetian tasks designed to assess the quality of children's reasoning. Typically, conservation tasks are mastered by children during the concrete operational period. Conservation can be defined as the realization that changes in appearance do not cause changes in quantity. Conservation is tested in the domains of number, length, liquid, mass, area, weight, and volume. In the conservation of mass task, a child is shown two identical balls of clay. The child is asked if the two balls have the same amount of clay. If the child believes that one of the balls contains more clay than the other, adjustments are made until the child believes the two balls have equal amounts. One of the balls is then flattened while the child watches. Again, the child is asked if the two balls have the same amount of clay. Children in the preoperational period believe that the flattened ball has either more or less clay than the rolled ball. Children in the concrete operational period understand three concepts that help them to realize that the amount of clay is unchanged: (1) Identity: An item's appearance can change without changing its identity. Using identity, the child reasons that only the shape of the clay has changed, not the amount. (2) Reversibility: The effects of actions can be reversed. Using reversibility, the child reasons that because the flattened clay could be rolled into a ball again, the amount has not changed. (3) Decentration: A change in one dimension can be compensated for by an opposite change in another dimension. Using decentration, the child reasons that although the flattened clay covers a wider area, it is also thinner than the rolled clay and that therefore the amount has not changed.

In general, Piaget believed that advances in reasoning are domain general, meaning they occur in all areas of knowledge. However, in the case of conservation, Piaget recognized a decalage. Decalage can be defined as instances in which children show more advanced forms of reasoning in one domain than in other domains. For example, children typically conserve number, length, liquid, and mass before they conserve area and weight and conserve area and weight before they conserve volume.

When Piaget's tasks are exactly replicated, his results have been widely validated both cross-culturally and across different cohorts. However, contemporary research has found that children show earlier evidence of identity, reversibility, and decentration when the traditional tasks are simplified.

—Karen E. Singer-Freeman

See also Cognitive Development; Piaget, Jean

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CONDUCT DISORDER

Conduct disorder (CD) is defined by the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition/text revision (*DSM-IV-TR*), as a repetitive and persistent pattern of behavior that violates the rights of others or violates major age-appropriate societal norms or rules. These behaviors fall into four main categories: (1) aggressive conduct that threatens physical harm to people or animals, (2) nonaggressive conduct that causes property loss or damage, (3) deceitfulness and theft, and (4) serious violations of rules. *DSM-IV-TR* also makes the distinction between children who begin showing severe antisocial and aggressive behaviors before age 10 (i.e., childhood onset) and those who do not show severe conduct problems before age 10 (i.e., adolescent onset).

Research on the development of conduct problems has uncovered a large number of risk factors associated with CD. These risk factors include dispositional characteristics located within the child (e.g., biological abnormalities, predisposing personality traits, cognitive deficits), as well as factors involving the child's social context (e.g., dysfunctional parenting practices, peer rejection, impoverished living conditions). Research suggests that risk factors have a cumulative effect on the development of problem behavior, with risk increasing in a linear manner from the presence of no risk factors to the presence of six or more risk factors.

Research has also suggested that not all children with CD develop their behavioral problems due to the same causal factors. For example, children in the childhood-onset group are characterized by a number of dispositional risk factors such as difficult temperament, impulsivity, low intelligence, and other cognitive deficits that act to exacerbate existing contextual risk factors (e.g., family dysfunction, impoverished living conditions) to place them at a greater risk for later maladjustment. Recent research also suggests that childhood-onset children can be further divided into (a) those who show a deficit in conscience development and are characterized by a callous and unemotional interpersonal style and (b) those who show very impulsive and emotionally dysregulated behaviors without a callous and unemotional style.

In contrast, youth in the adolescent-onset subgroup do not consistently show these risk factors. The conduct problems of adolescent-onset children are thought to be an exaggeration of the normative developmental process of identity formation that takes place in adolescence. If they do differ from other children, it seems primarily to be in showing greater affiliation with delinquent peers and scoring higher on measures of rebelliousness and authority conflict. The distinction between childhood-onset and adolescent-onset trajectories to CD is a very influential model for explaining the different pathways through which children may develop severe conduct problems. However, it is important to note that clear differences between children in the two pathways are not always found, and the applicability of this model to girls requires further testing.

Reviews of the treatment outcome literature have documented four treatments with proven effectiveness for reducing conduct problems in youth: (1) contingency management programs, (2) parent management training (PMT), (3) cognitive-behavioral programs, and (4) use of stimulant medication. Although each of these four interventions has proven to be effective in reducing conduct problems, even these treatments have a number of substantial limitations. These limitations have led researchers to propose the use of comprehensive and individualized treatments that take into account the different developmental pathways that children with CD have been shown to follow. Recognizing these developmental pathways can aid the clinician in determining which causal processes may be involved in the development of CD for a particular child and can guide decisions as to the most

important targets of interventions. Furthermore, knowledge of the developmental course of CD allows for the implementation of interventions as early as possible in the developmental sequence.

—Monica A. Marsee and Paul J. Frick

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CONFLICT

Conflict and development are bound together: Conflict both fosters maturation and is a product of it. Two distinct forms of conflict may be identified: intrapersonal conflict and interpersonal conflict. Each plays a different role in human development. Intrapersonal conflict denotes internal strife, the resolution of which may prompt social, cognitive, or emotional maturation. Interpersonal conflict signifies overt disagreement between individuals or groups that, depending on how it is managed, may either promote social skills and improve relationships or hinder social competence and disrupt relationships. Both forms of conflict appear to have a curvilinear relationship with developmental outcomes: Some conflict is necessary for optimal growth, but too much is counterproductive.

THE NATURE OF CONFLICT

Conflict is a broad term, widely invoked in the common vernacular and in the scientific literature to suggest a state of disagreement or opposition. The term carries different connotations depending on how it is experienced and who experiences it. Intrapersonal conflict describes a state of emotional turmoil, intellectual dissent, or motivational equiponderance that occurs within an individual. To be conflicted is to be consumed by internal rivalries and contradictory demands. Interpersonal conflict describes a form of social interaction involving two or more people, characterized by opposing goals and behaviors. The state of interpersonal conflict encompasses a broad category of events, from individuals exchanging opinions to armies engaged in mutual destruction. The earliest known English language use of the word conflict dates to the 15th century; both forms of use have common roots in the Latin *conflictus*, meaning throw or strike together, clash, contend, or fight. This shared etiology muddies fundamental distinctions between these two distinct forms of conflict.

Intrapersonal Conflict

Intrapersonal conflict encompasses four broad domains. At the emotional level, conflict reflects competing desires or impulses. Sigmund Freud attributed these base tendencies to aggressive and sexual proclivities with origins in the id (the unregulated physical self), which give rise to irreconcilable differences with constraints that are imposed by the superego (the social mores conveyed by family and culture). At the cognitive level, conflict reflects dissonance produced by incongruent facts, opinions, or modes of thought. Jean Piaget attributed these tendencies to equilibration, the innate human tension between a preference for stability and a drive to master the environment. Assimilation encourages stability by incorporating new information into existing mental schema. Should this prove insufficient for mastering the environment, accommodation is required to alter the mental scheme or, in extreme cases, the mental structure itself, in a manner consistent with the information available. At the level of the ego, conflict reflects developmental challenges. According to Erik Erikson, each life stage is defined by a distinct crisis that must be resolved. These crises represent choice points that collectively contribute to ego development and self-representations. At the motivational level, conflict reflects the need to choose between options perceived to be relatively equal in valence. Kurt Lewin identified three distinct forms of motivational discord. Two equally attractive options are described in contemporary terms as approach-approach conflicts. Two equally unattractive options are referred to

as avoid-avoid conflicts. Options that contain both attractive and unattractive elements are considered approach-avoid conflicts.

Intrapersonal conflict is by definition a private experience. It cannot be observed, and it has no clear, reliable metric. Early scientific psychologists relied on introspection to glean insight into thoughts, a practice modified and popularized by psychodynamic psychologists to probe unconscious emotional states. Subjective experience as a topic of study fell out of favor with the behavioral revolution. Reaction times, physiological cues, and projective responses were employed as proxies for inner conflict, but poor reliability and the absence of face validity undermined these efforts. Field theorists attempted to resolve the dilemma by quantifying motivational forces present in the environment. This visionary effort failed to attract a significant following because it proved cumbersome and ill suited for the methodological and analytic tools of the day. With the cognitive (counter) revolution, new introspective methods gained legitimacy as advances in measurement and instrumentation were applied to mental processes. Scholars began to focus on the diverse experiences of different cultural and ethnic groups, and in so doing it became apparent that scientific inquiry into intrapersonal conflict cannot proceed in the absence of valid and reliable self-report data.

Interpersonal Conflict

Interpersonal conflict may take place at the level of the dyad or the group. Dyadic conflict is a social episode marked by overt behavioral opposition. The function of a disagreement and the manner in which it unfolds varies according to characteristics of the participants and their relationship, the issue and context, the strategies employed, and their consequences. Group conflict refers to negative or incompatible attitudes and behaviors directed by members or representatives of one group toward those of another group. The nature and significance of intergroup conflict varies according to leadership styles and prevailing norms, member cohesion, resource availability, and the individual and collective talents and experiences of each group.

Interpersonal conflict is a quantifiable, often public event. It consists of a sequence of easily recognized and well-defined components including the initial opposition and the tactics, resolution, and outcome. The ease with which components of conflict may be identified has not engendered a common approach for quantifying experiences, however, and empirical studies of dyadic and group conflict suffer from inconsistent operational definitions. Conflict measures differ in terms of whether they assess oppositions defined by unilateral (one-sided disputation) or mutual (reciprocal contention) behavior and in terms of whether the frequency of an event is distinguished from its affective intensity. Distinct patterns of interpersonal conflict emerge when considering reciprocated as opposed to unreciprocated disagreements and when angry disputes are examined apart from the mundane. The earliest work on the topic involved labor-intensive observations of young children, but this soon gave way to laboratory studies of dyads and groups in experimenter-contrived conditions designed to elicit disagreements. Concerns about the ethical treatment of participants and a lack of generalizability prompted a renewed focus on ecological validity; unobtrusive observations in natural settings have been integrated with running assessments of psychophysiological states and moment-by-moment accounts of participant cognitions and affect. The significance of self-reports increased with the realization that participant views of conflict differ not only from one another but also from those of observers, suggesting that what was once considered measurement error may in fact represent systematic differences in how conflict is perceived and experienced. The nature of the relationship and the role one occupies tend to dictate individual conflict behaviors and shape each participant's interpretation of events.

THE ROLE OF CONFLICT IN HUMAN DEVELOPMENT

Conflict is inherent in growth. It follows that human development cannot proceed without conflict. Scholars agree that interpersonal and intrapersonal conflict shape developmental trajectories, but there is little consensus as to the exact mode of transmission. Developmental effects appear to be limited to specific domains of influence circumscribed by individual timetables and characteristics of the disagreement. There is evidence that wisdom, emotional maturity, and social skills are tied to a series of age-related tasks and the conflicts specific to each.

Intrapersonal Conflict

Intrapersonal conflict is instrumental to the attainment of several important developmental milestones.

First, conflict may prompt alterations in mental constructs and cognitive structures. Intellectual maturation and improved perspective-taking skills provide an impetus for change: A child confronted with a difficult moral dilemma may be forced to disregard notions previously held dear in order to objectively consider different viewpoints and reach a fair solution. Conflict may also give rise to changes in perceptions and priorities. Cognitive dissonance typifies this mechanism: A child forced to select a single partner for an outing may find that the esteem for one friend has been enhanced at the expense of others. Finally, conflict may alter affect and impulse control. Emotional regulation is central to this ability: A child who delays gratification to maximize rewards will learn to succeed by cultivating strategies that reduce emotional arousal and divert attention from proximate stimuli.

Theory concerning the ontogenetic significance of intrapersonal conflict has outpaced research on the topic. Much remains to be done, especially in the area of emotional development. As the empirical literature grows, so does confidence in the assertion that the influence of intrapersonal conflict is determined by the problem confronting the individual and the cognitive or affective domain invoked. Recent scholarship suggests that effects are further qualified by developmental timetables. The likelihood that some age periods are more susceptible to alterations than other age periods leads to the provocative suggestion that intrapersonal conflict is neither a necessary nor sufficient condition for development, but rather a factor that may, at certain times, facilitate advances in the specific emotional or cognitive arena in which it arises.

Interpersonal Conflict

Social competence and social development are inextricably entwined with interpersonal conflict. Disagreements, especially those in close relationships, are one of the primary means whereby individuals define themselves and delimit their interactions with others. Three influence pathways merit mention. First, conflict may prompt changes in self-understanding and self-evaluation. Significant disagreements force participants to reevaluate goals and tactics, offering opportunities to hone social perspective-taking and interpersonal negotiation skills. Second, conflict helps to determine patterns of social interaction that may impact developmental outcomes. Angry, coercive exchanges tend be self-perpetuating and, once started, they interfere with the dividends that normally accrue from close relationships; in contrast, constructive conflict management fosters a climate of warmth and problem solving that facilitates connectedness and affective sharing. Third, conflict may define and alter expectations about individuals and relationships. In some cases, roles and responsibilities are negotiated directly over the course of a dispute, but it is more often the case that participants evaluate their own behavior and that of their partner for clues as to whether current expectations are consistent with the capabilities of the relationship and the demands of the situation. Regardless of the influence pathway, successful conflict management is widely considered to be an important marker of developmental maturation.

There is considerable support for the premise that the developmental significance of conflict depends on the relationship in which it arises. Three relationship properties are germane: power, closeness, and permanence. Power describes the degree to which dominance shapes the relationship. Disagreements in horizontal relationships provide fertile ground for improved social skills because when power is shared, negotiation is necessary for a mutually satisfactory resolution; in vertical relationships, resolutions are more often the product of power differentials than negotiated settlements. Closeness describes the extent to which participants' lives are interdependent. Disagreements in close relationships have the potential to profoundly alter developmental trajectories because the interconnections that serve to maintain closeness also promote mutual influence; disagreements in other relationships rarely, if ever, shape the course of individual development. Permanence describes the stability of the relationship. Among close relationships, disagreements in voluntary affiliations are more likely to bring about individual change than those arising in obligatory affiliations; in contrast to conflicts with family members, who worry little about the dangers of relationship dissolution, disputes with friends and romantic partners are particularly salient because participants are normally expected to behave in a manner that promotes mutually satisfactory outcomes. Variations in relationship properties notwithstanding, developmental shifts in conflict management may be identified such that coercion is gradually replaced across childhood and adolescence with withdrawal and negotiation; subsequent life span trends in conflict behaviors remain to be explicated.

THE COSTS OF CONFLICT

Conflict is not inherently detrimental. The costs of conflict depend on the frequency with which it arises and the manner in which it is resolved. Excessive, poorly managed conflicts exact a steep toll. Some costs take the form of developmental delay; disagreement may interfere with establishment of important relationships and the acquisition of essential social skills. Destructive costs are more readily apparent; conflict spawns emotional turmoil, mental illness, relationship dissolution, and violence. No one is immune from the costs of conflict, but some suffer disproportionately, especially those who lack constructive strategies for coping with dissent.

Intrapersonal Conflict

The notion that intrapersonal conflict may inhibit development is not new. Some theorists believe that development is contingent upon a dialectic involving opposing psychological functions. Too much conflict, it is argued, could hinder normal development or even prompt a temporary state of regression. These principles have proven difficult to quantify at the global level, but they have received support in specific developmental arenas. The first instance arises early in life, when an insecure attachment relationship may give rise to avoidant or resistant internal working models characterized by anxious or oppositional worldviews. Inner struggles to reconcile the self with the environment are manifest in behaviors that interfere with the establishment and maintenance of supportive parent-child and peer relationships. Another instance arises during middle childhood and early adolescence. Improved cognitive and perspective-taking abilities enable youth with low self-esteem to obsessively ruminate about their behavior and their relationships, creating a vicious cycle of worry and apprehension that may interrupt critical developmental tasks in the educational, psychological, social, and occupational spheres. In both cases, inner conflict interferes with coping strategies, increasingly limiting healthy developmental pathways.

The costs of intrapersonal conflict extend far beyond missed opportunities and stunted growth. One specific form of inner conflict, anxiety, is a pernicious factor in a diverse collection of human maladies. Anxiety and anger have been linked directly to cardiovascular disease and hypertension and indirectly to debilitating changes in the immune and endocrine system. Chronic inner turmoil increases blood pressure, heart rate, and sympathetic arousal, amplifying risks from contagion and infection, and elevating rates of morbidity and mortality from cancer, human immunodeficiency virus, and viral illness. In addition to being a disorder in its own right, anxiety also features prominently in internalizing difficulties. Three forms merit mention. First, substance abuse may have origins in efforts to reduce anxiety. Second, heightened anxiety typically precedes and accompanies depressive episodes. Third, inner conflict is endemic among those who attempt and commit suicide. It should also be noted that the consequences of inner conflict are not limited to those who harbor the ill feelings. Conflicted individuals make poor company and poor decisions. Intrapersonal conflict often accompanies abuse, infidelity, and divorce among lesser mortals; starvation, dislocation, and war have been attributed to inner strife among the leadership elite.

Interpersonal Conflict

Developmental disadvantages may be traced to the disruptive influence that interpersonal conflict has on socialization processes. Chronic discord interferes with opportunities for social skills training in close relationships. Children who adopt coercive conflict management strategies early in life miss out on the crucial experience of negotiating resolutions and, as a consequence, fail to keep up with their peers in the development of empathy and role-taking skills. Social skills suffer, which may compromise sibling relationships and interfere with the establishment of friendships. The absence of constructive peer experiences may promote an information-processing bias that leads children to attribute hostile intentions to benign actions. This further diminishes positive contacts with peers and reduces the likelihood that children will gain the experience necessary for advanced levels of social perspective taking.

The costs associated with an inability to manage interpersonal conflict are significant. Delinquency and criminality appear to have origins in destructive conflict management skills acquired in coercive families. Young children inadvertently rewarded for noncompliant behavior learn to control their social environment such that the slightest opposition provokes an aversive outburst. Unable to constructively address disagreement, these children experience school failure

and peer rejection, which leaves them isolated and restricts their interpersonal world to all but the antisocial. Divorce and child adjustment difficulties may be traced to interparental conflict. Disagreement, in and of itself, does not promote marital instability; conflict is common in all marriages. Instead, divorce is best predicted by the regulation of conflict; satisfied couples maintain a ratio of at least five positive interactions for every negative one. When the balance tilts toward discord, a demand-withdrawal pattern emerges: Complaints by one partner elicit contempt, which prompts the other partner to react defensively and retreat by stonewalling. A family climate of hostility and unregulated conflict has significant adverse consequences for children. Negative affect between parents spills over onto children who experience similar emotions but are powerless to address their source. Prolonged exposure to angry, unresolved marital disagreements has been linked to delinquency, school adjustment problems, and depression. Furthermore, children model the resolution practices they witness: Youth from distressed households display markedly deficient conflict management skills.

THE PARADOXICAL INFLUENCE OF CONFLICT

Conflict is often unpleasant and aversive. Given the option, most people choose to avoid it. Research on conflict, especially interpersonal conflict, invariably focuses on adverse outcomes; benefits are rarely considered. The costs of conflict are well documented and widely appreciated. For this reason, it is commonly assumed that the consequences of conflict are uniformly negative and that disagreements provide little or no advantage. This assumption has been challenged conceptually on grounds that linear models overlook the beneficent role that conflict may play in maturation. A curvilinear model of influence captures this alternative perspective: Too little conflict limits the potential for growth and too much conflict overwhelms coping mechanisms, but moderate conflict may provide experience necessary for optimal development.

This curvilinear model of conflict influence remains largely untested, although there are instances in which it provides a good fit to the data. Intrapersonal conflict is a necessary prerequisite for the establishment of a healthy ego identity. Too little internal struggle over identity produces foreclosure or diffusion, too much results in an extended moratorium. Moderate levels of interpersonal conflict may also be proscriptive of family well-being. Families that suppress conflict demonstrate unhealthy levels of enmeshment that inhibits individuation; families that are demonstratively engaged in running combat tend to be isolated and alienated. Relationship quality may moderate this dynamic such that the potential benefits of conflict are realized only in the context of a history of supportive interactions: Disagreements that arise in warm, caring relationships with friends and parents have been found to promote identity development, role-taking skills, positive self-esteem, social problem solving, and school grades. Thus, conflict may be beneficial, detrimental, or benign; the consequences depend on how often it occurs, with whom it is experienced, and the way in which it is managed.

INTERVENTION EFFORTS

Strategies for reducing conflict and mitigating its adverse consequences have targeted individuals, relationships, and groups. Intervention approaches aimed at the individual have met with limited success. Some are designed to reduce overall levels of conflict, whereas others aim to improve conflict management skills. Interventions devoted to anger and anxiety management have demonstrated promising short-term reductions in internal strife; studies currently under way should clarify the long-term efficacy of these approaches during different developmental periods. Efforts dedicated to the reduction of interpersonal conflict fall into two camps. Some programs target characteristics of individuals that may predispose them to frequent or angry disagreement. These training programs have proven more successful at limiting impulsivity than aggression, but neither has enjoyed reliable success at minimizing conflict or improving conflict management skills. Other programs target the development of social competence and problem-solving skills as a means to reduce conflict and better manage those that do arise. Social problem-solving procedures assist children in the management of interpersonal difficulties. Social skills training programs implemented in schools across North America provide some immediate reductions in problem behavior, but commensurate improvements in conflict management remain to be documented.

Considerable attention has been given to the problem of dyadic and group conflict. Yet despite the diversity of therapeutic approaches for dealing with family discord, few models have received rigorous empirical

scrutiny. One of the earliest programs specifically designed to reduce conflict between parents and children has proven to be one of the most effective: Problem-solving communication training, an integration of family systems and cognitive-behavioral approaches, encourages constructive parent-child communication in a manner that reduces the escalation of a conflict. Dyadic approaches are more commonly applied to marital conflict. Many of these techniques focus on the twin goals of supplanting negative attributions with positive ones and adopting constructive discourse strategies that enhance communication and limit negativity. Short-term successes are well documented, but persistently high rates of divorce are a testament to the fact that long-term solutions remain elusive. Peer conflict has also received considerable attention. There is evidence that the peer mediation programs adopted by many North American schools to address rising levels of violence are successful in teaching children constructive strategies for conflict resolution and in training peacemakers to intervene in disputes. These efforts tend to offer modest reductions in serious peer conflict and reports of improved conflict management practices. Finally, although much ink has been spilled over the goal of averting conflict between groups, a cursory glance at the daily news suggests that success remains elusive. Initial work on the topic proved encouraging. Experimental studies revealed that animosity could be manipulated through competitive and cooperative activities. In-group and out-group biases, a source of considerable discord, are susceptible to exposure and information exchanges. Unfortunately, progress in understanding the origins of intergroup conflict have not translated into progress in averting and minimizing strife.

CONCLUSION

Research on conflict typically focuses on its potential for adverse consequences. Yet the nature of this research is such that it is impossible to determine whether maladaptation is the cause or the consequence of disagreement. Intervention efforts aimed at mitigating adverse outcomes are hampered by a lack of research that makes a full and nuanced account of the dynamic interplay between conflict and adjustment. Critically needed are accounts that specify how conflict may be beneficial to human development and when conflict should be viewed as a symptom or by-product that signals difficulties in other arenas.

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—Brett Laursen

See also Aggression, Bullying

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CONGESTIVE HEART FAILURE

Heart failure is a chronic condition in which the heart is unable to pump a sufficient volume of blood to supply the body's oxygen needs. High-output failure results from intolerable increases in oxygen demand, often resulting from thyrotoxicosis, beri-beri, and other conditions and does not reflect underlying heart disease. It will not be further discussed in this article. Low-output failure, or congestive heart failure (CHF), results from various cardiovascular diseases.

CHF is a disease of the elderly; failure in infancy and childhood is almost always the result of the obstruction of efficient outflow of blood from the heart because of diseased valves, whereas in adults intrinsic heart disease is the most frequent finding. Mortality in heart failure shows a bimodal age distribution, with a peak around age 1 year and a continuous rise after age 50. The gap between these peaks reflects the fact that young children either die or have the defect repaired surgically, and patients between 1 and 50 years old are in early stages of disease.

After the initial insult, the inability of the heart to pump blood forward adequately results in the accumulation of blood in the venous circulation (congestion), hence the term *congestive heart failure*. Venous congestion also occurs in the vessels of the lungs, resulting in pulmonary edema. Fatigue, reduced exercise tolerance, shortness of breath, and generalized hypoxia are the inevitable consequences.

The primary defect is unknown, but viral infections and exposure to toxins such as alcohol are thought to be the cause in some cases. Other known causative factors are ischemic heart disease and myocardial infarction (direct myocardial cell injury) and hypertrophic changes resulting from uncontrolled high blood pressure. Recent research has focused on the role of apoptosis secondary to genetic damage and reversion of energy-generating and contractile proteins in the myocardium to less efficient, fetal forms resulting from the secretion of endogenous growth factors. A weakening of the heart's force of contraction during systole (systolic dysfunction) may result from one or several of these factors.

Whatever the underlying defect, once pump function falls behind demand, the progression of the disease is almost entirely the result of compensatory mechanisms triggered by physiologic perception of low-volume status. The low-volume status is perceived because the bulk of blood volume is in the venous circulation, waiting to be pumped forward by the failing heart, whereas the body's volume and pressure sensors are located chiefly in the arterial circulation, downstream from the heart. These compensatory events would be beneficial in a short-term, low-volume situation, but are maladaptive in a long-term situation.

The first compensation is an attempt to maintain blood pressure by raising myocardial pumping force and arterial vasoconstriction through stimulation of the adrenergic division of the autonomic nervous system. In acute blood loss this would be effective, but in the chronic failure situation, the prolonged exposure of the heart to adrenergic neurotransmitters (epinephrine and norepinephrine) results in direct myocardial toxicity, and the prolonged vasoconstriction increases the work the heart must perform in order to overcome the increased resistance to blood flow caused by arterial vasoconstriction. The body attempts to increase blood volume through activation of the kidney-based renin-angiotensin-aldosterone system (RAAS), the effect of which is to generate circulating angiotensin II (a powerful vasoconstrictor) and aldosterone (a mediator of sodium and water retention). The chronic effects of vasoconstriction are the same as those of the activated adrenergic system, but of no less importance is the role of angiotensin II and aldosterone as myocardial growth factors that promote hypertrophy and remodeling of the cardiac muscle mass. Additionally, renal secretion of vasopressin (antidiuretic hormone) is stimulated, resulting in vasoconstriction and conservation of water by the kidneys. A vicious cycle is entered, wherein perceived low blood volume triggers

water retention and increased vascular resistance, both of which increase the work of the heart required to move blood. An inexorable deterioration of pump function ensues.

Reduced pump function may also occur as a result of the inability of the heart to relax completely during diastole, which results in incomplete filling for the next pump cycle (diastolic dysfunction). Regardless of the mixture of systolic and diastolic dysfunction, the compensatory changes directed toward maintenance of blood volume are the main forces driving disease progression.

Without treatment, mean survival is 5 years from diagnosis. Progressively worsening pump function and global hypoxia account for 50% of CHF deaths; the other 50% are the result of fatal cardiac arrhythmia provoked by hypoxia, electrolyte disturbances (resulting mainly from activation of the RAAS), and cardiac enlargement.

CHF is the most frequent diagnosis-related group occurring in hospital admissions and accounts for a major portion of patient drug and hospital expenditures and public assistance for medical care. The vast majority of heart transplant surgery is occasioned by advanced CHF. Patients with advanced disease suffer from discomfort, limitation of activity, reduced employment, and early death.

Treatment is presently not directed toward the fundamental defect, since this is unknown in the majority of cases. Older therapies include diuretics to reduce the volume overload and inotropic agents, such as digoxin, that increase the force of myocardial contraction, neither of which has affected mortality. Recently, drugs that interrupt the events of the RAAS (angiotensin-converting enzyme inhibitors such as captopril and enalapril) have not only yielded improved quality of life, but are shown to prolong survival. Beta-adrenergic blockers such as propranolol, metoprolol, and carvedilol have also resulted in extended survival. Both classes of drugs lower blood pressure and so are not tolerated in all patients. Lastly, spironolactone, a competitive antagonist of aldosterone, has recently been shown to improve survival. Present therapy includes all three classes as tolerated, plus diuretics if volume overload is evident, and digoxin if these therapies fail to achieve the desired effect. Future treatments will likely involve genetic manipulation directed toward apoptosis and contractile protein subtypes.

—Roy Parish

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CONGREGATE HOUSING

While the majority of older adults live in independent, free-standing housing throughout their lives, advanced age necessarily increases the likelihood that an individual will benefit from an enriched supportive living environment. Congregate housing responds to the needs of persons 65 years and older who wish to have a limited set of support services available to them in their own separate apartments. Congregate housing, as conceived of here, is noninstitutional and should not be equated with nursing home care or homes for the aged, which represent settings in which more intensive services, health and medical in particular, are required because of an individual's level of functional impairment.

The underlying philosophy reflected in the congregate housing concept is that the older individual or couple should be able to have a range of services and amenities available while still maintaining substantial independence and autonomy. Such housing is meant to be comfortable, clean, safe, and affordable.

Congregate apartments may be rental or ownership units. Also called enriched housing, clustered housing, or sheltered housing, congregate housing has been shown to result in substantial cost savings as compared with the expense of nursing home care. It has also been argued that this type of housing can help prolong independence, provide companionship, and otherwise buttress an older adult's personal support network, thus reducing isolation and increasing opportunities for socialization.

Congregate care can be offered under public or private auspices and may be subsidized by government programs such as Section 8 of the Federal Housing Authority. The congregate housing concept first surfaced in 1963 as a specific recommendation made by President Kennedy to Congress. It was not until 1970 that Congress included construction funds for congregate housing as part of the 1970 Housing and Community Development Act. Legislative support was further affirmed in Section 7 of the Housing and

Community Development Act of 1974. In 1978, federal legislation authorized the Congregate Housing Services Program (CHSP) as Title IV of the Housing and Community Development Amendment. That legislation authorized contracts with local public housing agencies and nonprofit corporations to provide congregate independent living service programs. The CHSP program was the largest experiment ever undertaken by the federal government aimed at integrating housing environments and social and human services. Substantial impetus arose from the belief that individuals should have a range of options available to them in terms of housing choices. The promise that such housing would represent a low-cost alternative to institutional care represented an additional factor in driving this legislation.

There are usually income eligibility guidelines in public congregate care whereby residents are able to reside in such buildings for approximately 30% of their income, including rent, utility, and services. If it is a private, for-profit facility, depending on the services offered and the region of the country, monthly rent could range from $700 to as much as $2,500.

Congregate housing is an appropriate option for individuals who are relatively independent but would benefit from any and all of the following services: built-in safety features; laundry service; building security; transportation to shopping areas and medical appointments; housekeeping services; social, health promotion, and recreational programs; meal programs (the availability of one, two, or three centrally delivered meals a day); emergency call systems should a medial crisis arise; and social services in general. While health care is not a congregate housing option, individual residents often are able to pay for their own home health visiting nurse or aide.

—Lenard W. Kaye

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CONSCIENCE

Conscience is the set of faculties that allows one to participate in the social world by balancing one's needs and desires with those of others. Conscience is evident in behavior that is consistent with an individual's own moral standards. Often, at the core of these standards is a value of the rights and welfare of others. Conscience is expressed both through doing (e.g., giving one's bus seat to someone who looks tired) and not doing (e.g., not taking a friend's toy). A key feature of conscience is that it sustains moral functioning independent of external intervention (e.g., by parents, police). Current understanding of conscience has roots in Sigmund Freud's theory of the struggle between superego and id and Emile Durkheim's description of internalized morality as self-restraint, the precedence of social engagement over egoism, and autonomous reflection based on standards of conduct.

Conscience integrates capacities for emotional arousal, mental representation, and behavioral self-regulation. The emotional features of conscience include self-focused and other-oriented arousal that reinforces and motivates acceptable behavior and punishes and inhibits inappropriate behavior. Self-focused emotion includes negative (e.g., guilt) and positive (e.g., pride) arousal, dependent on whether one's behavior contradicts or promotes internal standards. For example, violation of one's principles results in guilt and remorse that is unpleasant. This negative emotion discourages future violations and may be assuaged through corrective action. Importantly, the self-focused emotion component of conscience does not depend on immediate external consequences and thus differs from, for example, the fear of being caught. Other-oriented emotional arousal, coupled with the ability to take others' perspectives, is another feature of conscience. This empathic component prompts awareness of the effects of one's actions on the feelings of others and elicits emotional arousal (e.g., concern), both of which influence behavior choices.

The mental representation component of conscience allows one to store and reference prototypes of moral conduct. Such representations are based on direct articulation and modeling of values and appropriate behavior (e.g., by parents). These also are gleaned from experiences with, for example, misbehavior, altruism, disciplinary encounters, and associated

emotional arousal. In this way, conscience formation is unique to one's particular assimilation of life experiences and socialization.

A central component of conscience is the capacity for impulse control, attention, and sustained effort, known as behavioral self-regulation. This capacity reflects executive brain functioning, rather than the popular notions of simple motivation or self-control. Without adequate self-regulation, the other components of conscience may not be consistently expressed in moral behavior. Such has been found in some studies of aggressive children, who did not differ from nonaggressive children on knowledge of rules or capacities for empathy or guilt. Instead, some of these children's difficulties were explained by less mature executive functioning that seemed to thwart the expression of their more mature faculties.

The features of conscience work in concert: A failure to regulate a selfish impulse may injure a friend, activating empathic concern, awareness of a standard violation, and self-censure through guilt. The process of development in these features is captured by the term *internalization*. This includes an inward transition of behavioral control from external to internal regulation, a growing sense that standards governing behavior are self-generated rather than externally imposed, and increased attribution of anxiety associated with rule breaking to internal rather than external causes. Notably, the development of conscience is undermined by some discipline strategies, such as physical punishment, that focus children's attention on external causes of emotional discomfort and reasons for compliance. Conscience is best fostered through discipline that teaches the reasons for moral behavior and the consequences of one's behavior for others. For example, the reason that lying is wrong is because it takes advantage of others and hurts friendships, not because it results in a spanking. Positive parenting practices support the development of conscience and sustain moral functioning in the absence of external forces—that is, when no one is looking.

—David C. R. Kerr

See also Psychoanalytic Theory

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CONSERVATION

Conservation refers to the knowledge that the quantitative properties of objects are not changed by a mere change in perceptual appearance. As adults, we take such knowledge for granted. We do not believe that the amount of juice changes if it is poured into a different-shaped container, nor are we concerned that we have less to eat if a cookie arrives in three small pieces rather than one large one.

Children, it turns out, think differently. One of the most influential discoveries in the history of child psychology was the demonstration by the Swiss psychologist Jean Piaget that young children do not at first understand principles of conservation. Across a dozen or so books and scores of experiments, Piaget and his coworkers explored just about every form of conservation imaginable: conservation of number, mass, and quantity; of length, weight, and area; of time, speed, and movement. The general approach was similar across tasks: presentation of two stimuli equal on some quantitative dimension, followed by a transformation so that the stimuli no longer looked equal. Whatever the content area, children younger than 5 or 6 consistently judged that the quantity had changed when the appearance changed. Thus, young children really seem to believe that spreading out a row of candies increases the number or that rolling a clay ball into a snake changes its weight.

In Piaget's theory, such nonconservation responses are a characteristic of the preoperational period of development, the period between roughly 2 and 6 when children have not yet developed logical operations and are therefore easily fooled by misleading appearances. Conversely, the gradual mastery of conservation (and some forms, Piaget showed, are slower to develop than others) is a hallmark of the concrete operational period—the period of middle childhood during which a

set of mental operations evolves that allows children to solve a wide range of logical and physical problems, including the various conservation tasks.

The conservation phenomenon was the subject of hundreds of studies in the decades of the 1960s, 1970s, and 1980s. In general outline, these studies confirmed Piaget's claims: Young children fail conservation tasks, success emerges only gradually across the childhood years, and some forms of conservation are more difficult than others. At a more specific level, however, the later work revealed a number of discrepancies from the original Piagetian account. Piaget's assessment procedures were often unduly complicated; when the procedures were simplified in various ways, success was often evident at younger ages. Furthermore, the variability in response across different forms of conservation proved to be even greater than that reported by Piaget. Children might succeed on some conservation tasks by age 4, whereas other tasks would continue to baffle them well into adolescence. Findings such as these were a major contributor to the declining popularity of general-stage theories of development, most notably Piaget's theory of concrete operations.

Conservation is no longer the subject of concentrated research effort, a fate that has befallen many once popular topics in the history of psychology. In large measure, however, the decline in interest reflects the success of the earlier wave of studies. Despite some differences in detail and some unresolved questions, Piaget's general conclusions regarding conservation—including the existence of an apparently universal initial phase of nonconservation—rank among the most solidly established, and important, findings in child psychology. In addition, the general Piagetian emphases that are evident in the study of conservation—the focus on basic forms of knowledge, the interest in qualitative and not merely quantitative changes with development, the demonstration of surprising gaps in young children's understanding—live on in contemporary work in cognitive development, most notably the burgeoning research area known as theory of mind.

—Scott A. Miller

See also Cognitive Development

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CONTINUITY AND DISCONTINUITY IN DEVELOPMENT

Arguably, the key task of developmental scientists is to describe and explain developmental change. Changes may occur within an individual across the life span, and there may be between-person differences in such intraindividual change. The description and explanation of intraindividual change involves the concepts of developmental continuity and discontinuity, whereas the description and explanation of interindividual differences in intraindividual change involves the concepts of stability and instability.

In regard to continuity and discontinuity, descriptions or explanations of development can involve quantitative or qualitative changes. Descriptively, quantitative changes involve differences in how much (or how many) of something exists. For example, in adolescence, quantitative changes occur in such areas as height and weight since there is an adolescent growth spurt, and these changes are often interpreted as resulting from quantitative increases in the production of growth-stimulating hormones.

In turn, descriptive qualitative changes involve differences in what exists, in what sort of phenomenon is present. The emergence in adolescence of a drive state never before present in life—that is, a reproductively mature sexual drive—and the emergence in adolescence of new and abstract thought capabilities not present in younger people—that is, in Jean Piaget's terms, formal operations—are instances of changes interpreted as arising from qualitative alterations in the person. It is believed that the person is not just "more of the same"; rather, the person is seen as having a new quality or characteristic.

Explanations of development also can vary in regard to whether one accounts for change by positing quantitative changes (e.g., increases in the amounts of growth hormone present in the bloodstream) or by positing a new reason for behaviors (e.g., an infant's

interactions in his or her social world are predicated on the need to establish a sense of basic trust in the world, whereas an adolescent's social interactions involve the need to establish a sense of identity, or a self-definition). In other words, it is possible to offer an explanatory discontinuous interpretation of development involving either quantitative or qualitative change.

For instance, when particular types of explanatory discontinuous qualitative changes are said to be involved in development, the critical periods hypothesis is often raised, as in Erik Erikson's work. The point is that on the basis of adherence to a particular theory of development (e.g., what has been termed, in the scholarship of Gilbert Gottlieb, a predetermined epigenetic, or natural one), qualitative changes are believed to characterize ontogeny, and because of this, discontinuous explanations of change are needed.

Thus, virtually any statement about the character of intraindividual development involves, explicitly or implicitly, taking a position in regard to three dimensions of change: (1) descriptive continuity-discontinuity, (2) explanatory continuity-discontinuity, and (3) the quantitative versus the qualitative character of one's descriptions and explanations—that is, the quantitative-qualitative dimension pertains to both description and explanation. In essence, then, one may have descriptive quantitative discontinuity coupled with explanatory qualitative continuity, or descriptive qualitative continuity coupled with explanatory quantitative discontinuity, and so forth.

For example, a feature of personality (e.g., a component of temperament, such as mood) may remain descriptively the same over time. It may be represented or depicted isomorphically at two different temporal points (e.g., positive mood may be represented by the percentage of facial expressions per unit time that are scored as indicative of smiling). Such cases therefore may be an instance of descriptive, qualitative continuity. However, more of this qualitatively invariant phenomenon may exist at time 2 (e.g., there may be more smiles per unit time), and thus descriptive quantitative discontinuity may be coupled with descriptive qualitative continuity.

Moreover, both descriptive quantitative discontinuity and descriptive qualitative continuity may be explained by the same ideas, such as by continuous explanatory principles. For example, smiling may be assumed to be released across life by biogenetically based physiological mechanisms. Alternatively, descriptive continuity or descriptive discontinuity may be explained by different ideas, such as by discontinuous explanatory principles. For instance, smiling may be assumed to be biogenetically released in early infancy and mediated by cognitively and socially textured processes across subsequent developmental periods. Indeed, if different explanations are, in fact, invoked, they may involve statements that constitute either quantitatively or qualitatively altered processes.

In short, the particular couplings that one posits as involved in human life will depend on the substantive domain of development one is studying (e.g., intelligence, motivation, personality, or peer group relations) and, as we shall see, primarily on one's theory of development. That is, any particular description or explanation of intraindividual change is the result of a particular theoretical view of development. This implies that commitment to a theory that focuses only on certain variables or processes will restrict one's view of the variety of changes that may characterize development. Indeed, theory, not data, is the major lens through which one "observes" continuity or discontinuity in development.

THE CONTRIBUTIONS OF HEINZ WERNER

Heinz Werner believed that considerable confusion existed among human developmentalists over the continuity-discontinuity issue and that at the crux of this confusion was a lack of understanding about two different aspects of change (i.e., quantitative and qualitative). He argued that these two aspects of change must always be considered in discussions of descriptive and explanatory continuity-discontinuity. However, Werner explained the superordinate conceptual importance of the qualitative-quantitative dimension of change.

Quantitative Change

In regard to the quantitative aspect of development, we have noted that there is change in a feature of development in regard to how much of something exists. Quantitative change is an alteration in the amount, frequency, magnitude, or amplitude of a developmental variable or process. For example, imagine that a person's weight has been measured at the same time during each of his 8th through 13th years. He weighed 125 pounds when he was measured at 8, 9, 10, 11, and 12; but he weighed 150 pounds when he was measured at 13. Thus, a quantitative change occurred in how much weight existed between the times of measurement occurring at ages 12 and 13 years.

Alternatively, the child's change in weight could have been gradual. By gaining 5 pounds per year, the child gradually goes from 125 to 150 pounds between his 8th and 13th years. With gradual quantitative changes, the rate of change stays the same—is continuous—from one measurement time to the next. This is quantitative continuity.

Thus, quantitative change may be abrupt. There are no intermediate steps by which the person's weight gradually moved from one level (amount) to the next. In measuring this change, there is a gap between one point in the measurement curve and another; that is, a curve representing the different measurements is not smooth but has an abrupt change in its direction. There is a "gappiness" in the curve—a lack of an intermediate stage between the earlier and later levels of a variable. The occurrence of an abrupt change is quantitative discontinuity.

Qualitative Change

The second aspect of change that Werner specifies is the qualitative one. Here we are primarily concerned not with how much of something exists but with what exists—what kind or type of thing exists. Thus, we are concerned with whether or not a new quality has come to characterize an organism, whether something new has emerged in development. When we are considering qualitative change we are dealing with epigenesis, or emergence.

In distinguishing between quantitative and qualitative aspects of change, Werner highlights a core conception of the organismic position. Some of the types of changes that comprise development are emergent changes. These are changes in what exists rather than in how much of something exists. Something new comes about in development, and because it is new—because it is qualitatively different from what went before—it cannot be reduced to what went before. Hence, if at time 1 we can be represented by 10 oranges and at time 2 we can be represented by a motorcycle, we cannot reduce our time 2 motorcycle status to our time 1 orange status.

To take another example, before puberty a person may be characterized as being (in part) composed of several drives—for example, a hunger drive, a thirst drive, a drive to avoid pain, and perhaps a curiosity drive. With puberty, however, a new drive emerges (or, at least, emerges in a mature form)—the sex drive. With this emergence the adolescent begins to have new feelings, new thoughts, and even new behaviors which, according to Anna Freud, may be interpreted as being a consequence of this new drive. The emergence of this new drive is an instance of qualitative discontinuity. The sex drive cannot be reduced to hunger and thirst drives, for instance.

Hence, qualitative changes are by their very nature discontinuous. A qualitative, emergent, epigenetic change is always an instance of discontinuity. Moreover, not only is an emergent change an irreducible change, but it is a change characterized by gappiness. As indicated above, developmental gappiness occurs when there is a lack of an intermediate level between earlier and later levels of development. It should be clear that gappiness must also be a part of an emergent change. The presence of an intermediate step between what exists at time 1 and the new quality that emerges at time 2 would suggest that the new quality at time 2 could be reduced through reference to the intermediate step. Since we have just seen that an emergent change is defined in terms of its developmental irreducibility to what went before, it is clear that gappiness must also be a characteristic of any emergence.

CONCLUSIONS

The characteristics of emergence and gappiness are needed to describe qualitatively discontinuous changes in development; on the other hand, the characteristic of gappiness (abruptness) alone seems to suffice for characterizing quantitatively discontinuous changes. Thus, to quote Heinz Werner:

> It seems that discontinuity in terms of qualitative changes can be best defined by two characteristics: "emergence," i.e., the irreducibility of a later stage to an earlier; and "gappiness," i.e., the lack of intermediate stages between earlier and later forms. Quantitative discontinuity on the other hand, appears to be sufficiently defined by the second characteristic. . . . To facilitate distinction and alleviate confusion, I would suggest substituting "abruptness" for quantitative discontinuity, reserving the term "discontinuity" only for the qualitative aspect of change. (p. 133)

What Werner has provided us with, then, is a clarification of the concepts involved in appropriately considering the continuity-discontinuity issue. He has given us the conceptual means with which to discriminate between quantitative continuity-discontinuity

and qualitative continuity-discontinuity in developmental change.

—Richard M. Lerner, Pamela M. Anderson, Lang Ma, and Lisa M. Smith

See also Critical Period, Development, Stages of Development

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CONTRACEPTION

Procreation and sexual behavior are two of the most important of human behaviors. Without sex and procreation the species would not continue. Unfortunately, these behaviors are not well studied due to both methodological challenges and cultural taboos. There are, however, a few basic facts and distinctions that can be identified. According to Warren B. Miller, *proception* (those behaviors engaged in to produce offspring) can be distinguished from *contraception* (behaviors designed to prevent unintended pregnancies while engaging in sex). And, although contraception is the focus here, note that there are many issues to consider regarding proception, especially given the fact that about 15% of all couples suffer infertility problems when desiring to conceive a child.

Sexual behavior typically begins during the adolescent years. The term *sexual debut* has been used to identify the transition from virginity to nonvirginity status. By the age of 16, more than 60% of both U.S. males and females have experienced this debut. According to Robert Hatcher and his colleagues, "most adolescents who have intercourse do so responsibly. The majority of adolescents use contraceptives as consistently and effectively as most adults." Comparing 1979 statistics with 1990 statistics, those using a contraceptive at first intercourse jumped from less than 50% to more than 70%. The problem is that contraception is not used consistently and correctly, even by most adults. Two of the largest risk factors for women's health are unintended pregnancy and exposure to sexually transmitted infections (STIs). Contraceptive use is designed to prevent unwanted pregnancies. Some (but not all) contraceptive methods also protect against STIs. These cases provide "dual protection." Unfortunately, it is still the case that approximately one half of all pregnancies in the United States are unintended and for every 1,000 women 15 to 19 years of age, 71 have an unintended pregnancy—a rate only exceeded by those 20 to 24 years of age, at 96 per 1,000. Contraceptive use is not what it should be.

Two distinctions relevant to contraceptive behavior are important. The first of these is the fact that although it is possible to identify the theoretical efficacy of differing methods of contraception (often labeled "perfect use"), humans are not perfect, and use of contraceptives is often impacted by circumstances, such as the dynamics of the relationship, the cultural context, and the "heat of the moment." Hence, the actual efficacy of methods is labeled "typical use" and is a lower rate than the theoretical estimate. Consequently, even though a method might be described as 99% effective, when used inconsistently, incorrectly, or tentatively, the observed efficacy may be much less than this, perhaps even in the 70% to 80% range. The second distinction involves the fact that some methods, known as natural family planning methods (NFP), do not depend on the use of products or artificial hormones. Examples of these methods include abstinence, calendar rhythm, withdrawal, and monitoring of a woman's mucus. Alternatively, methods using barriers and/or hormones are often labeled "modern methods." Natural and modern methods have varying arguments for their use, demonstrate varying degrees of efficacy, require varying degrees of sophistication by those using the methods, and evince differing gaps between perfect and typical use rates.

MAJOR METHODS

The major methods used around the globe vary dramatically as a function of culture and expense. Natural methods used by women depend on an understanding of the female's body and the functioning of her menstrual cycle. Many women have cycles that are just less than a month in duration. Natural methods depend on estimates of the time of ovulation—typically toward

the middle of this cycle. Intercourse is avoided prior to and during ovulation. In a related fashion, a female's mucus changes consistency and feel prior to ovulation, and thus can be used to estimate the time of ovulation—and intercourse is avoided. A more recent NFP technology is available in Europe (Persona) that identifies the shifts in a woman's hormones, predicts and identifies her days of ovulation, and can assist in training a woman to understand her own cycle. This product offers an educational opportunity to adolescent women, but is rather expensive. In the United States, less than 10% of all women utilize natural methods for contraception.

Major modern methods throughout the world include barrier and hormonal approaches. Barrier methods include the condom, female condom, and diaphragm. Hormonal methods include the pill, injectables, and the intrauterine device (IUD). Recently, patches have been approved for use, mostly in the United States. It is important to distinguish those couples that intend to have more children from those who do not. In the United States, those not wanting more children depend on female sterilization (46%) and male vasectomy (18%) more than any other methods. Note that there is no protection from STIs with these methods. For those intending to have more children, 51% use the pill and 32% use the condom. In countries such as France and Egypt, the IUD is one of the most popular methods.

NEW METHODS

Of particular importance to adolescents are some of the more recent contraceptive methods approved for use. These include emergency contraception (EC), patches, injectables of varying duration, and Mirena. Emergency contraception has actually been available for decades, but has just recently been made available by manufacturers and physicians. Simply put, the hormones used in many oral contraceptives (pills) will prevent conception if taken in larger doses immediately after intercourse (perhaps up to 3 days but more effectively if taken sooner). EC is especially recommended for those experiencing an unanticipated, unwanted, or forced sexual experience, or one during which another method has failed, such as a broken condom. Patches that adhere to the woman's skin in a fashion similar to an adhesive bandage contain hormones similar to those contained in pills. Patches are worn for varying lengths of time, depending on the brand, and not during menstruation. They do not need to be remembered every day, as do pills. Similarly, manufacturers are developing injections (again containing hormones) that prevent pregnancy for varying lengths of time (1, 2, or 3 months). They may become more popular than multiple year injections. Mirena is a product similar to the IUD that not only prevents pregnancy, but also seems to have many reproductive health benefits, such as preventing fibroid growth and reducing the risk for cervical cancers. Mirena has become extremely popular in England, where IUDs are more popular than in the United States. Lastly, researchers are confident that a number of new methods will be developed in the next 10 years. They include a male pill, an externally applied spray (spray-on) for either men or women, and topical microbicides (gels) that might provide dual protection.

GENDER, NEGOTIATION, AND RELATIONSHIPS

It is difficult to understand behavior related to contraception without attention to gender. In fact, most methods are identified as either male methods (e.g., condoms, vasectomy) or female methods (sterilization, pill, IUD, diaphragm, patches, EC). Furthermore, choice and use of a male or female method are often determined by whether the male or the female member of the couple is making the choice.

Clearly, the nature of the couple relationship also influences choice of method. Only one half of U.S. adolescent couples actually talk about contraception prior to sexual debut. Many methods require some type of negotiation, and all too often it is the young woman who is not in a position to negotiate. Too often sexual behavior is impacted by force, coercion, and power differentials (both gender and gender's interaction with economics are at play here). Some research suggests that the individual most committed to the relationship actually wields the lesser power, going along with the other's opinion so as to not scare the partner away from the relationship. The clearest example of differential power involves transgenerational sexual activity. In many African cultures the practice of "sugar daddies" is popular, and increasingly "sugar moms" are as well. In these cases, an older man provides economic incentives (including food, clothing, schooling, etc.) to a young woman (not his wife) for sexual favors. The young woman stays in the sugar daddy relationship for the economic benefits, while also having a same-aged boyfriend for "love."

On a more positive note, many couples choose among contraceptive methods for the impact that they may have on their intimate relationship. In many cultures, men have criticized the condom as they argue that pleasure is diminished, in spite of data questioning that argument. Some methods are better than others in not disrupting the heat of the moment (pills, injectables, etc.) or requiring one to plan ahead (diaphragms, having condoms handy, etc.). Conversely, new methods such as microbicides or spray-ons may provide extra lubrication, thereby making intercourse more pleasurable. The commercial success of similar feminine hygiene products suggests that the creation of contraceptive methods that actually make sexual activity more fun is possible. Such methods might be especially popular with adolescents and those beginning their sexual behavior.

Most importantly, the field of contraception research has much to address. Basic questions remain regarding how we can help people engage in healthy reproductive behaviors and have planned pregnancies, avoid unwanted pregnancies and STIs, access contraceptives in a dignified manner, and use contraceptives safely, consistently, and effectively.

—Lawrence J. Severy

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CONVERGENT THINKING

The term *convergent thinking* is defined as the process of finding the single best solution to a problem or question, such as arriving at the answer to a multiple choice question or figuring out how to program your VCR. Coined by J. P. Guilford in 1950, convergent thinking is a process that seeks out the right or best possible solution from many possibilities. Some types of questions that require convergent thinking are multiple choice tests, logic puzzles, and text comprehension questions. Convergent thinking questions often require the subject to resolve, explain, identify, or define.

Convergent thinking is usually contrasted with divergent thinking, which is defined as searching for a variety of relevant solutions to problems that have many possible answers, such as when one is brainstorming for topics to write about for a poem. Some examples of questions that tap divergent thinking include predicting what may happen if the stock market crashes or imagining the possible outcomes of different marketing campaigns for a new product. Divergent thinking questions often require the subject to predict, imagine, compose, or create. Divergent thinking incorporates the ability to generate multiple ideas from a single starting point. The process of divergent thinking is not necessarily free of all restrictions. When writing a poem, one may follow the precise rules outlined for a sonnet or haiku and still engage in divergent thinking. Convergent thinking is usually tested by performance on tasks requiring analytic and reasoning skills, whereas tests that measure divergent thinking are thought to reflect creativity.

Developmentally, many educational psychologists believe that the current education system tends to emphasize convergent thinking over divergent thinking and that this emphasis encourages children to refine related skills and traits over others. Students are often encouraged to memorize facts and algorithms rather than to engage in creative projects. Most of the

usual testing formats, such as multiple choice, true/false, and fill-in-the-blank questions are designed to reflect convergent thinking processes. Additionally, most standardized achievement tests also reflect convergent thinking. Recently, some researchers have advocated an approach to education that recognizes and encourages divergent thinking skills in addition to convergent thinking.

There are some personality differences between individuals that possess a more convergent thinking style versus those that possess a more divergent thinking style. Convergent thinkers tend to be more intolerant of ambiguity compared with divergent thinkers, and thus tend to be uncomfortable in areas that do not emphasize correct answers such as philosophy or art. Also, individuals with a convergent thinking style tend to be more introverted than divergent thinkers. Finally, convergent thinkers tend to have an external locus of control compared with divergent thinkers. Although these studies are correlational in nature, they provide an idea of individual differences associated with each thinking style.

In summary, convergent thinking is the process of finding the single best possible solution to a problem. It is contrasted with divergent thinking, which is defined as searching for a variety of answers to a single problem. Convergent thinking is emphasized throughout the life span; however, divergent thinking skills are also thought to be developmentally important.

—Rick Tatsch and Shannon Whitten

See also Creativity, Divergent Thinking

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COOPERATIVE LEARNING

Cooperative learning refers to instructional methods in which students work in small groups to learn academic content. Cooperative learning methods vary widely. Group sizes may range from pairs to groups of four or more. Children may be asked to work on projects, to tutor each other, or just to help each other as needed. Each group member may be responsible for a unique part of a task, or all may have the same assignments.

There are four major theoretical traditions that attempt to explain why cooperative learning should improve student learning. Each envisions and recommends different forms of cooperative learning.

Motivational theories of cooperative learning focus on the reward structure surrounding group work. Motivational theorists advocate the use of cooperative learning methods in which there is a group reward (such as recognition for successful groups) that the group can achieve only if all group members learn the academic content. For example, in "student teams—achievement divisions," or STAD, children work in four-member teams to help each other master a well-defined objective, such as adding fractions, using commas correctly, or balancing chemical equations. Each week, group members take a brief quiz and teams whose members show the greatest gains receive certificates or other recognition. The only way the team can succeed is for the group members to learn, so this is where the group's energies are focused. A key element of such methods is individual accountability, which means that the group is rewarded based on the sum or average of individual children's performance, not on an overall group task. The rationale is that if there is one group task (such as solving a single problem or completing a common project without distinct roles), some children may do the thinking part of the work while others watch or do clerical or art work (as when one child makes a bar graph and teammates color it).

The evidence favoring cooperative learning methods that use group goals and individual accountability is strong. A 1995 review identified 64 studies of at least 2 weeks' duration that evaluated programs incorporating group goals and individual accountability. These studies involved grade levels 2 through 12 and a wide variety of academic subjects. Fifty of these studies found significantly positive effects, and the remainder found no differences, for an effect size of +0.32. In contrast, studies of programs that did not use group goals and individual accountability found few differences, with an overall effect size of +0.07.

A second major perspective on cooperative learning is social cohesion theories, which emphasize the idea that because students identify with their group and want each other to succeed, they will work effectively to help their groupmates learn. A hallmark of such methods is an emphasis on team-building activities to create an "esprit de corps" within groups, but a de-emphasis on the use of external rewards.

Evidence for achievement outcomes of programs based on the social cohesion perspective is mixed. Such methods can be effective if they provide well-structured individual tasks within a group project.

A developmental perspective, based on theories of Piaget and Vygotsky, holds that interaction among peers enhances their mastery of critical concepts, and theorists in this tradition recommend against rewards or structure. There is much evidence from brief laboratory studies to support the idea that cognitive change can come from interaction itself, but longer-term evaluations in classroom settings have been rare and inconclusive.

A related perspective is called cognitive elaboration, which posits that cooperative learning enhances achievement by giving children an opportunity to master information by summarizing and restating their current understandings in working with peers. Methods in this category often involve pairs of students taking turns teaching each other discrete skills or content. Methods based on this theory, such as reciprocal teaching, cooperative scripts, and reciprocal peer tutoring have strong evidence of effectiveness.

Cooperative learning can be broadly applied to improve student learning, but research supports the idea that to be effective, cooperative methods should incorporate group goals, individual accountability, and task structures to emphasize cognitive elaboration of academic content.

—Robert E. Slavin

See also Learning

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COOPERATIVE PLAY

Children of all ages play and enjoy playing. Psychologists have found that play is important for children not only because they enjoy it so much, but because it also plays an important role in promoting social, emotional, and cognitive development. During play, children learn skills that help them interact with other children and adults, and they also gain knowledge about the world around them. Psychologists have studied the types and amount of play that are evident in children at different ages.

Children have been noted to engage in four different types of play during the preschool years. Early in life, infants play alone and engage in what is called solitary play. Later, between 2 and 3 years of age, parallel play emerges as children begin to play alongside other toddlers with similar materials, but without influencing each other much. Next, associative play begins to include true social interactions when children engage in a common activity and exchange toys and comment on the behavior of each other. Finally, at around 5 years old, cooperative play emerges, when children begin to work together and assume reciprocal roles while pursuing shared goals during their play. For example, children take leadership roles, discuss rules, and negotiate responsibilities. This cooperative play is social play of the most complex type. Cooperative play is especially important because it allows children to learn social rules such as sharing, turn taking, cooperation, and dealing with disagreements. Also, this type of play leads to the development of meaningful friendships.

While more complex types of play develop as children grow older, the less mature forms of play may still be present but are less common. Parallel play should be less frequent as children grow older and will be largely replaced by cooperative play. Psychologists often observe young children's play activities to assess their level of development. If a child does not begin to engage in cooperative play by about 5 years of age, this may be seen as an indication of an underlying cognitive or social-emotional deficit. For example, the inability to engage in fantasy or social play is a common feature of children with autistic spectrum disorders.

Cooperative play not only becomes more frequent as children develop socially, cognitively, and emotionally, but it also becomes more complex. When children begin to enter into cooperative play episodes, they are often quite simple interactions, such as two children working on a puzzle together. As children get better at this type of interaction, the play gets more complex. For example, an older child may engage in a fantasy play episode of "cops and robbers" with a group of children. This complex type of cooperative play is often called sociodramatic play. It is more complex and provides children with experiences rich in cognitive and social challenges. It is important that children master sociodramatic play because here they act out and respond to one another's pretend feelings. They explore and gain control over fear-arousing situations when their pretend play involves such things as monsters or doctor visits. Also, while involved in such play interactions, children must create and manage complex plots and resolve disputes via negotiation and compromise.

Finally, there are clear connections between the complexity of preschoolers' play and social competence with peers. Preschoolers who play in cognitively complex ways are less likely to be aggressive or withdrawn around their peers and are more outgoing than children with impoverished play. Also, the complexity of preschoolers' play can help predict how socially and academically successful children will be during early elementary school.

—Mike Feder and Adam Winsler

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CORPORAL PUNISHMENT

Corporal punishment refers to intentional application of physical pain as a method of changing behavior. Youth in the United States experience various forms of corporal punishment in two primary places: their homes and their schools. When corporal punishment occurs in the home, it can be thought of as a form of family violence. The most severe forms of corporal punishment occur with very young children, pregnant teens, and adolescent males between the ages of 15 and 17. Spanking is the most common form of corporal punishment used by adults to discipline children. The use of spanking as a disciplinary method is controversial. Parents often consider the use of spanking as a helpful and effective method of child rearing that teaches morals and values to a growing child. However, rather than being employed as an effective disciplinary intervention that is metered out in proportion to the misdeed, parents or teachers are more likely to administer the timing, intensity, and frequency of corporal punishment according to their parental or teacher mood than the child's actual misdeeds.

HISTORICAL PERSPECTIVE

Corporal punishment against children has been an acceptable form of discipline for thousands of years. Adults have often interpreted legal and religious doctrines to support the use of physical discipline as essential to the rearing for obedient, respectful, well-controlled children who learn appropriate appreciation for authority, develop better social skills, have improved moral character, and learn to better discipline themselves.

Children have been whipped, caned, paddled, spanked, slapped, switched, shoved, choked, punched, and kicked in the United States since colonial times.

CORPORAL PUNISHMENT AS A FORM OF VIOLENCE

Violence in this context is the act of harming or damaging a human. Corporal punishment is a form of

violence or human aggression. The most extreme outcome of violence is death. Examples of other extreme outcomes of corporal punishment include sexual violence, sexual assault, rape, physical abuse, physical assault, violence committed with a weapon, murder, and homicide. Any and all forms listed above can include acts of hitting, kicking, scratching, biting, pushing, shoving, slapping, pinching, squeezing, punching, or using an object to inflict harm. Those objects can be used to inflict damage through stabbing (knives and other sharp objects), shooting (guns and bows and arrows), or hitting with a stick, belt, switch, board, paddle, rock, and so forth.

Supporters of Corporal Punishment

Advocates of corporal punishment include most American parents, many teachers, organizations such as the National Association of Secondary School Principals and the American Federation of Teachers, some religious organizations, and the majority of family physicians and pediatricians. The majority of American parents spank their small children (under 5 years of age). Advocates of corporal punishment do not just contend that children should be physically punished for every misdeed. They also advocate other methods be tried first or paired with physical punishments and that the actual spanking or hitting of children be used only as a last resort. Supporters of corporal punishment further contend that the research that finds against corporal punishment only refers to severe forms of physical punishment and does not apply to what happens in most homes and schools.

Opponents of Corporal Punishment

Opponents contend that any form of physical punishment is a form of violence, is an ineffective method of discipline, and has major deleterious effects on the physical and mental health of its victims. Opponents also find that there is no empirical evidence that physically punishing children enhances moral character development, increases respect for teachers or other authority figures in general, or creates better controlled individuals. Youth under the age of 15 are at greatest danger of being victims of violence in the form of corporal punishment in two primary places: their own homes at the hands of their parents or caregivers and their schools at the hands of their teachers, counselors, assistant principals, and principals. Individuals who are exposed to more severe forms of corporal punishment in their homes are at increased risk for physical and emotional abuse, disability, and death. Children who grow up in violent homes are at risk for learning several early and powerful lessons: (a) violence is an inherent part of a "loving" relationship; (b) violence is an acceptable way to assert one's views, get one's way, and resolve conflict between partners; and (c) violence is an acceptable method to discharge stress.

Youth who are severely physically punished become more rebellious and are more likely to demonstrate vindictive behavior and seek retribution against parents, school officials, and others in society. The use of severe corporal punishment can result in what is termed operant aggression. In this form of aggression, the victim uses the same physical intervention that was used against him or her on the parent or adult who was administering discipline. The victim retaliates to destroy or immobilize the parent or teacher to prevent delivery of further punishment. Elicited aggression can also result from the punishment in which the victim physically attacks others in the environment, even those who are not the source of the original punishment. The victim simply wants to destroy or immobilize anything that might cause delivery of additional punishment.

Children who grow up in coercive families may become aggressive and further initiate aggressive interchanges that they have learned from their parents or teachers. Children who are victims of corporal punishment in their homes or schools are seen in doctor's offices and emergency rooms every day. Injuries from these medical visits include abrasions, severe muscle injury, extensive hematomas, whiplash damage, life-threatening fat hemorrhage, and others (including death).

When corporal punishment is used in the school system, it can produce an environment that is unproductive, nullifying, and punitive. Rather than providing an atmosphere of opportunities to learn academically and socially, children who are physically punished become victims, and trepidation is introduced to all students in such a classroom. The victim and witnesses of such abuse can develop low self-esteem, magnified guilt feelings, and various anxiety symptoms, which may have negative results on the psychosocial and educational development of these students.

The student does not learn to adopt societal values and attitudes as his or her own and is not motivated by intrinsic or internal factors; rather, the child or adolescent

learns to elude detection and to use violence as a means to influence others

During the 1970s, organizations that opposed violence against children in our school systems included the American Civil Liberties Union (ACLU), American Orthopsychiatry Association, American Psychological Association, National Center on Child Abuse Prevention, American Academy of Pediatrics, American Bar Association, American Medical Association, Parent-Teacher Association, National Education Association, and Society for Adolescent Medicine. These and over 20 other groups united to ban the practice of physically punishing children and youth in school. Currently 75% of states in the United States have legally banned corporal punishment in schools.

—Helen D. Pratt

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CORRELATION

Does high school grade point average (GPA) predict college performance? Does reading to a child help future school performance? Researchers, legislators, business people, teachers, and parents are all interested in how variables are related. This relationship is the general way in which different values of one variable are associated with different values of a second variable. The degree of relation permits us to predict future behavior and performance. Correlation can refer to either the statistic used to represent the degree of relation between two variables or to the correlational level of interpretation in research methods.

The correlation coefficient, often denoted as r, is a statistic that describes how strongly variables are related. The correlation coefficient ranges from −1.00 to +1.00. It provides two important pieces of information about the relationship between two variables. The strength describes the degree of relation in numerical terms. The closer to 1.00, the stronger the degree of relation. When describing the strength of the correlation, the sign, either positive or negative, is ignored. Zero indicates that the two variables are not related. In other words, knowing variable A does not tell you anything about variable B. Knowing a person's shoe size tells you nothing about his intelligence. In contrast, a correlation of 1.00, either positive or negative, would allow you to perfectly predict changes in variable B from changes in variable A. Most correlations fall somewhere between zero and 1.00. The correlation between high school GPA and first year college success is about +.5. This means that about 25% of the variability in first year college success can be explained by high school performance. The percentage of variability explained is obtained by squaring the correlation.

The sign of the correlation provides information about the direction of the relationship between the two variables. A positive correlation indicates that the variables change in the same direction. In other words, when the values of one variable increase/decrease, the values of the second variable increase/decrease in the same direction. For example, on average, the more a person studies for a test the better their grade tends to be. Both variables change in the same direction.

A negative correlation indicates that the variables changed in opposite directions. In other words, when the values of one variable increase/decrease, the values of the second variable increase/decrease in the opposite direction. For example, there is less hot chocolate consumed in the summer than in the winter. Therefore, the relation between amount of hot chocolate consumed and outside temperature is negative.

Correlational designs, nonexperimental designs that seek to describe relationships between variables without directly manipulating the variables, are useful for prediction. The major problem with the use of findings from correlational designs is that they are often interpreted in a causal manner. Correlations can be used in research involving both experimental and nonexperimental methods. It is important to note that causality cannot be inferred from correlational analysis when working with the nonexperimental methods. Without proper experimental control, researchers cannot determine the direction of cause and effect. For example, in a bivariate relationship, the change in variable X could cause the change in variable Y. However, it is also conceivable that variable Y is causing the change in variable X. When a nonexperimental method is used, there is also the danger that no direct causal relationship exists between the two variables. Instead there may be a relationship between the two variables because some other variable causes them both. This third variable limits the ability of the researcher to identify the cause of changes in the variables.

—Stephen Burgess and Tabitha Smith

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COSLEEPING ARRANGEMENTS

Cosleeping is generally characterized by caregivers and their children sleeping in close proximity, either with the caregiver and child sharing a bed or the child sleeping in the same room as the caregiver but in a separate location, such as a bassinet or crib. Cosleeping can entail children and caregivers sharing sleeping locations for all or part of a night for all or just some nights.

Cosleeping has been identified as the predominant sleeping pattern for families across the world. Despite this widespread use of cosleeping, questions concerning potentially negative outcomes associated with cosleeping abound, particularly in the United States and other Western-based cultures. Negative outcomes have focused on the likelihood of increased night wakings for cosleeping infants in comparison with infants who sleep separately from caregivers and soothe themselves back to sleep upon waking.

A review of what is known regarding children's sleep suggests that night wakings and needs for parental attention are normative across all sleep types, recede over the course of development, and may not be problematic for cosleeping families. For example, the night wakings associated with cosleeping infants are identified as problematic by families engaged in reactive cosleeping (i.e., cosleeping in response to infant sleep problems), but not by families engaged in cosleeping by choice. Furthermore, reports of sleep problems associated with cosleeping arrangements tend to vary based on families' cultural backgrounds, children's or mothers' temperament, or other environmental factors and thus may reflect questions of caregivers' expectations for sleep and socialization goals.

Physiologically, cosleeping leads to lighter infant sleep, in comparison with solitary sleeping patterns characterized by greater periods of quiet sleep. During cosleeping, infants' and caregivers' breathing patterns and sleep cycles become synchronous. These physiological characteristics of cosleeping children, as well as the higher level of parental monitoring associated with cosleeping, may guard against sudden infant death episodes, which can occur when infants fail to continue breathing during sleep.

In regard to social development, caregivers' attention to infants' waking during the sleep routine may help to build a strong attachment between caregiver and infant and thus help form the basis for children's development of a secure attachment and the associated positive social outcomes. In addition, cosleeping may contribute to the likelihood of breast-feeding, which is associated with psychological and health benefits for infants. Despite these potential benefits, some

concerns have been raised that cosleeping, in comparison with solitary sleeping arrangements, may compromise children's development of independence and children's ability to separate from parents. Empirical support can be found for positive social outcomes associated with both cosleeping and solitary sleeping arrangements. Furthermore, a preliminary research report has associated children's positive social development with caregivers' comfort with their chosen sleeping arrangements, but not caregivers' and infants' engagement in one specific type of sleeping pattern.

Cosleeping has been cited as putting infants at risk for suffocation by overlaying or wedging between the caregiver and bedding. In light of these concerns, solitary sleeping arrangements have been identified as safer for infants and often proposed as the preferred sleeping arrangement. However, some research studies report that cosleeping is not more risky unless caregivers smoke cigarettes, are overweight or overly fatigued, use soft bedding, sleep in arrangements where infants became overheated, or use drugs or alcohol.

Given the varied outcomes associated with cosleeping and other types of sleep patterns, and given the universal acceptance of cosleeping, this sleeping pattern represents a viable and important sleep option for parents and professionals to consider when addressing infant and toddler sleep needs. The viability of cosleeping as a sleep option is further supported in that neither cosleeping nor other types of sleep arrangements have been associated with definitively fewer sleep problems for infants or toddlers or with better sleep habits at later developmental stages.

—Wendy Middlemiss

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COURTROOM TESTIMONY

In the courtroom, it is often the testimony of a witness that determines whether an alleged perpetrator will be convicted of a crime. Courtroom testimony from a witness in a civil case can determine how that case is resolved. When crimes such as murder or rape occur (or, in the realm of civil law, when an accident occurs), there are two primary types of evidence: eyewitness accounts and physical evidence. In many cases, the courtroom testimony of the eyewitness is the primary or only evidence that the alleged perpetrator committed the crime or that an accident unfolded in a particular way. Yet, there is reason to believe that eyewitnesses are not always accurate. In the past decade, in cases where prisoners have been released because new DNA evidence has conclusively proved their innocence, mistaken eyewitness identification has been shown to be the most common cause of what we now know were wrongful convictions. In addition, new research on child witnesses and acquittals in several highly publicized child abuse day care cases have raised questions about children's ability to testify.

WHAT IS COURTROOM TESTIMONY?

Courtroom testimony is oral evidence given under oath by a witness in answer to questions posed by attorneys at trial or at a deposition.

WHO GIVES TESTIMONY?

There are three basic types of witnesses: lay witnesses (or eyewitnesses), character witnesses, and expert witnesses. Lay witnesses are people who perceive an event (by seeing, hearing, smelling, or other sensory perception) related to the trial. Character witnesses are people who testify in a trial on behalf of a person (usually a criminal defendant) as to that person's ethics and morality both by the personal knowledge of the witness and the person's reputation in the community. Such testimony is admissible (1) when the guilt of an accused party is doubtful and the character of the defendant is involved in the question; (2) to affect the damages in civil cases, where their amount depends on the character and conduct of any individual; and (3) to impeach or confirm the veracity of a witness. Finally, expert witnesses may testify when knowledge of a technical subject matter might be helpful to a judge or jury. People with special training or experience in technical fields are admitted as expert witnesses and are permitted to state their opinion concerning those technical matters, even though they were not present at the event.

HOW ACCURATE IS EYEWITNESS TESTIMONY?

A number of general statements can be made about eyewitnesses:

1. People remember more about central components of an event than details, and the more stress someone is under, the fewer details they will remember. For example, a witness is more likely to remember the actions and speech of a person than to be able to describe the room or the perpetrator's shoes. An extension of this concept is that when a weapon is present, witnesses tend to focus on the weapon more and on the person wielding the weapon less. In this scenario, the weapon becomes a more central component of the event (and thus remembered) and the wielder of the weapon becomes a less central component of the event (and thus less remembered).

2. People can confuse pieces of several true events to the extent that they believe that people or events in one situation were present in a different situation. For example, imagine that after a bank robbery a person runs outside and bumps into a news vendor. Later this witness is shown a lineup that does not have the robber in it but does have the news vendor in it. The witness may accidentally identify the news vendor as the robber from the lineup because the face of the news vendor is familiar and the witness assumes the face is familiar because of the robbery.

3. We know that in most situations younger witnesses, particularly preschool-aged children, provide less information than adults; more of the information they do provide is inaccurate; and they are more likely than adults to succumb to pressures to change their reports. This is an important problem for the prosecution of child abuse because children are often the only witnesses to the crime.

4. Other known facts are that witness confidence is not necessarily related to accuracy even though jurors tend to believe that more confident witnesses must be correct and that even subtle and unintentional suggestions from authority figures, such as the police, can cause witnesses to distort their reports.

HOW DO JURORS PERCEIVE WITNESSES?

Eyewitness testimony has a powerful effect on jurors' judgments. Jurors are more likely to convict a defendant if an eyewitness identifies him as the perpetrator than if there is only circumstantial evidence linking him to the crime. Identifications from eyewitnesses influence jurors' decisions even when the eyewitnesses are discredited, for example, by admitting that their vision is very poor. Eyewitness testimony influences jurors' decisions irrespective of the witness's viewing conditions. However, jurors tend to put less weight on the testimony of a child who has witnessed an event than on the testimony of an adult eyewitness. Still, in sexual abuse cases, younger victims are viewed as more credible than adolescents or adults, perhaps because jurors suspect that younger children lack the sexual knowledge to fabricate such allegations.

Testimony from an eyewitness influences jurors' perceptions of a defendant's culpability (or, in a civil case, of the manner in which an accident occurred) because many jurors assume that the witness's memory is accurate. As mentioned previously, for central items, a witness's memory is likely to be accurate. But in the aftermath of a crime or an accident, gist

memory may be insufficient. In these situations, precise details about how the defendant looked or about how an accident occurred are necessary. Unfortunately, eyewitnesses to crimes often have poor memories of the precise details that would implicate one defendant and exculpate another.

Jurors can be sensitized to the factors that influence the reliability of eyewitness identifications. Courtroom testimony from an expert witness for the defense can educate jurors about the difficulty of cross-racial identifications, the influence of a weapon, and the effects of lineup suggestiveness on eyewitness memory, among other things. This expert testimony increases jurors' sensitivity to the effects of a witness's viewing conditions. Specifically, jurors who hear this testimony deem the defendant more culpable when the eyewitness identification was made under good witnessing conditions than when the identification was made under poor conditions.

SPECIAL ISSUES IN EYEWITNESS TESTIMONY

The Suggestibility of Children

An increase in the reporting of child abuse and the consequent rise in child courtroom testimony has encouraged research in the area of child witnesses. In cases of child abuse, often the only witness to the event is the child. One major area of study within the field of child witnesses is the influence of adult interviewers on child witness competency. Researchers have established that neutral interviewing techniques such as open-ended and free recall questions elicit the highest rates of accuracy but fewer details in the youngest children. On the other hand, more suggestive interviewing techniques such as close-ended and repeated questions have been found to increase details provided by the child by increasing both accurate and inaccurate details. Furthermore, leading questions, particularly when repeated over time and paired with other suggestive techniques (e.g., stereotype induction) can cause some subset of children to describe events that never occurred.

Types of Lineups and Cross-Race Identification

Recent research on the issue of photographic lineups has shown that the "typical" method of showing the witness six photographs or six people (i.e., showing all of them at once, called a simultaneous lineup) leads to less accurate suspect identification than showing witnesses one photograph or person at a time and asking them if this person is the suspect (called a sequential lineup). The idea is that if people view photos all at once they start to rely on relative judgments (i.e., which person looks most like the robber) rather than absolute judgments (i.e., is this individual the robber). People make more errors in relative judgments about photographic lineups. An additional twist is that we now know that witnesses make more errors when they are making identifications of suspects of a different race from their own. For example, a witness of African heritage will make more errors when trying to identify perpetrators of Asian heritage than when trying to identify perpetrators who are also of African heritage.

SUMMARY

Witnesses are a primary component of Western systems of justice, and there are three basic types: eyewitnesses, expert witnesses, and character witnesses. Eyewitness accuracy is significantly degraded in a variety of common witnessing conditions (e.g., in stressful situations, after long time delays, when identifying someone of a different ethnic background). Despite these mitigating factors, jurors tend to believe in the accuracy of eyewitness testimony and generally do not attend to the types of conditions that are known to cause inaccurate testimony. However, jurors tend to put less weight on children's eyewitness testimony than adults' eyewitness testimony, which is consistent with the knowledge that child witnesses are more susceptible to suggestive interviewing techniques than adults.

—Livia L. Gilstrap and Edie Greene

See also Memory Failure

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CRACK BABY SYNDROME

With the arrival of the relatively inexpensive and smokable crack form of cocaine, the rate of newborns exposed to cocaine in utero rose dramatically in the early 1990s. In the mid-1990s it was estimated that 1.1% of pregnant women used crack cocaine. Early reports of neonatal behavioral abnormalities led to the label "crack baby syndrome" and were followed up with several large, longitudinal studies. Crack cocaine–exposed neonates were demonstrated to be more jittery and less likely to modify their attentional behavior based on their arousal state. During the first year, infants exposed prenatally to crack cocaine are rated as having more attentional abnormalities and being less successful at remembering stimuli in their environments. However, the term *crack baby syndrome* is now generally recognized as inappropriate beyond the early neonatal period, after which time the behavioral differences are more subtle and do not constitute a distinct syndrome.

Several large-scale studies were funded to follow crack cocaine–exposed babies over time. They found that the mothers who had used crack cocaine during pregnancy were different from pregnant women recruited from similar economic and ethnic/racial groups. The mothers of the cocaine-exposed infants were (1) more likely to have used alcohol, cigarettes, and marijuana during pregnancy; (2) were more likely to continue to use alcohol and drugs of abuse postnatally; and (3) were more likely to have symptoms of psychiatric distress prenatally/postnatally. These polysubstance use and psychological characteristics of crack cocaine–using women have been repeatedly documented and found to have their own negative effects on child development.

One question addressed by these studies is to what degree are any persistent difficulties seen due to the cocaine exposure itself, not the other risk factors. In regards to overall mental functioning in early childhood, some studies found small effects of the cocaine specifically and others found no effect. However, specific effects of cocaine exposure on global functioning reported in infancy were no longer detectable, or subtle, by school age.

However, several studies have shown that cocaine exposure is associated with disruptions in attention and inhibition that could not be attributed to differences in maternal functioning and exposure to other substances. These independent relations of cocaine exposure on attention and inhibition have been confirmed in animals and persist into school age. In particular, the difficulties seem to be in paying attention to the information that is important in the moment and using that information to reach goals, as opposed to acting impulsively. Unfortunately, the attentional and planning abilities that are particularly sensitive to crack cocaine are also vulnerable to alcohol, cigarette, and marijuana use during pregnancy. So although the specific effect of the cocaine may be small, crack cocaine–exposed children usually are exposed to multiple substances that all impact on the same system.

Although it may not ameliorate the effects of cocaine on attention, positive environments have been shown to reduce the rate of mental retardation and increase verbal IQ in cocaine-exposed children. The hopeful findings of researchers is that providing a home life supportive of mental development makes a substantial impact on how crack cocaine–exposed children are doing as they enter school age.

—Julia S. Noland

See also Cocaine

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CRAWLING

The onset of crawling is a major milestone in infant motor development that also heralds a dramatic and pervasive set of changes in psychological functioning. Crawling represents the culmination of a long and complex struggle to overcome and then exploit the effects of gravity from the prone position. Once acquired, independent mobility offers many new opportunities to act on one's intentions, to explore the world, and to profit from the numerous encounters that are now possible with that world.

The terms *crawling* and *creeping* are often used interchangeably, although each refers to a distinct pattern of limb motions. Crawling is a pattern of prone locomotion in which the abdomen is in contact with the surface of support, whereas creeping is a pattern of prone locomotion in which the abdomen is above the surface of support and the weight of the body is supported by either the forearms and knees, the hands and knees, or the hands and feet. The term *creeping* is not particularly fashionable in the contemporary literature. Researchers prefer to use the terms *belly crawling* and *hands-and-knees crawling* to refer respectively to patterns of prone locomotion in which the abdomen is either in contact with the surface of support or not in contact with the surface of support.

The development of crawling is a complex process that involves qualitative shifts in the patterns of interlimb coordination used to propel the body and quantitative improvements in speed and efficiency. As many as 23 stages have been identified in the development of prone locomotion, and 25 patterns of interlimb coordination have been identified for propulsion. Although there are large individual differences in the rate at which crawling develops and in the patterns of limb motion used while on the belly, once infants adopt the hands-and-knees posture, they quickly converge on a diagonal gait in which the contralateral arm and knee move together (e.g., left arm–right knee followed by right arm–left knee). The diagonal gait is thought to be the most biomechanically efficient and stable way to move on four limbs because it ensures a wide base of support and minimizes medial-to-lateral and forward-backward shifts in the center of gravity. It should be noted that even though the diagonal gait is thought to be the most efficient form of prone locomotion, moving in the prone position is mechanically and metabolically less efficient than moving in the upright position, although the differences between the two modes of locomotion are larger for adults than for children.

Researchers once thought that the development of crawling was predominantly a function of neuromuscular maturation. However, it is now recognized that many factors, particularly opportunities for practice, play an important role in crawling acquisition. For example, the age at which crawling is achieved is influenced by season of birth (with infants born in the winter months tending to crawl earlier than infants born in the summer months), the extent to which infants are wrapped in heavy bedclothes, the amount of time infants spend in a prone or supine position, and the degree to which a particular cultural group values the onset of crawling. With respect to the latter factor, infants reared in cultures that promote upright postures tend to crawl later (or not at all) compared with infants raised in Western cultures, and in some cultures crawling is prohibited because it is viewed as primitive and demeaning. In contrast, the onset of crawling is accelerated with training in cultures that value independence from the mother.

Finally, the onset of crawling has been linked to major changes in psychological functioning, including the emergence of wariness of heights, the ability to search for hidden objects, the use of more sophisticated strategies to code one's position in space, the ability to use more spatially delimited patterns of optical flow for postural control, and the ability to understand the referential gestural communication of others. Researchers are now attempting to determine whether the acquisition of crawling is causally related to these phenomena or whether it is simply a maturational forecaster of these important psychological changes.

—David I. Anderson and Joseph J. Campos

See also Infancy

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CREATIVITY

A kindergartener's finger painting, a composer's sonata, a scientist's discovery—many seemingly disparate acts can be labeled "creative." While creativity has been widely valued both in children and adults, the concept of creativity has varied greatly in its definition. Creativity is conceptualized by some as a desirable trait that a person is either gifted with or lacking, while others believe that a person's creativity, like many other complex behaviors, can be promoted given the right environment.

WHAT IS CREATIVITY?

Process, person, or product—what is creativity, and where is it to be found? Creativity is thought by some to be a mysterious inner process that can be neither tested nor taught. Some consider creativity to be part of the person, describing a woman as creative as readily as they would describe her tall. Still others find that creativity can be attributed to the product itself and describe ideas, painting, and songs as creative. At its simplest, creativity is the behavior of producing something new, whether it is an idea or a product.

In 1959, Joy Paul Guilford explored the relationship between intelligence and creativity. He hypothesized that the link was problem solving. Guilford detailed two kinds of problem solving: convergent thinking and divergent thinking. Convergent thinking, the type most often reinforced in academic settings, is a manner of problem solving in which the problem solver narrows all of the possible answers down to one single solution. Divergent thinking is a mode of problem solving in which the problem solver creates a number of solutions for one problem. Guilford believed that divergent thinking was at the heart of creativity, and he, like many others, found the educational system to promote almost exclusively convergent thinking. It is now widely recognized that both convergent and divergent thinking play their own part in creativity, because divergent thinking enables the problem solver to come up with a number of possible solutions while convergent thinking leads to a course of action chosen from those many and varied ideas. In Guilford's theory of creativity there are several components of divergent thinking: originality, fluency, flexibility, and elaboration.

ASPECTS OF CREATIVITY

People are said to be behaving creatively when they produce a product or an idea that is original or different. The product or idea may be different in relation to others produced by the individual, by others in their peer group, or in relation to the society in which they live. It is generally held that to be creative an idea or product must be not only new but also useful or appropriate. A student who throws blocks at his teacher rather than building with them might be said to be engaging in a new or different behavior, but it would be unlikely to be judged creative.

A trait that is often deemed a necessary ingredient of creativity is fluency. Fluency is shown when a person generates many different yet suitable responses to a stimulus within a set amount of time. It is thought that a person who is able to come up with a large number of responses has a greater chance of producing a creative response. Most common in creativity testing is ideational fluency, the ability to name things that belong to a given class. A person might, for example, be asked to name as many things as they can in 1 minute that are long. While initial responses such as "pole" or "stick" may lack in originality, ideas produced later in a sequence are often more original, such as "a frog's tongue." Other types of fluency include word fluency, the ability to easily state a large number of words containing a given letter, and associational fluency, the ability to easily state synonyms for a given word.

Flexibility is the ability to shift approach when addressing a problem. For example, in the above problem of listing things that are long, answers such as "pole," "stick," and "frog tongues" are all items that are measurable with a ruler. Showing flexibility in answering would be additionally listing answers such as "geometry class" or "the wait for a bus on a cold day." Spontaneous flexibility is shown in the above example, while adaptive flexibility is demonstrated when a problem solver who has headed down the

wrong path on a problem can effortlessly take a new tack. Both increase the probability of solving a problem by allowing the problem solver to come up with a number of different approaches and easily "switch gears" when it is discovered that they have proceeded in the wrong direction.

Elaboration is filling in the details of an idea or product. This procedure extends the response, supplementing the original to make it clearer or better. The process of elaboration completes an idea or product and may describe how it may be constructed, used, improved, or how it may impact others.

TESTING FOR CREATIVITY

Once the components of creativity are broken down into observable, measurable units of behavior, creativity testing is possible. Although there are countless tests for creativity and they vary a great deal in their content and structure, creativity tests generally center on the idea of divergent thinking, and most test for the above components of flexibility, fluency, originality, and elaboration. Creativity tests tend to have questionable predictive validity, meaning that results are unlikely to accurately predict whether or not a student will behave creatively or become a creative adult. However, most creativity tests have been found to be fairly reliable in the sense that a person's scores change very little upon repeated testing.

The most widely used test of creativity is the Torrance Test of Creative Thinking. Both a verbal and a nonverbal component make up this test. The verbal Torrance Test for Creative Thinking consists of six word-based activities in which students are asked to perform tasks, including considering alternative uses for common items, answering hypothetical what-would-happen-if questions, generating questions, and improving products. The nonverbal or figural Torrance Test for Creative Thinking is composed of three picture-based activities in which students are asked to draw as many pictures as possible given a repeated shape, take forms and make them into pictures by adding lines, and complete a picture through drawing.

Both components are scored for fluency, flexibility, and originality. Additionally, the nonverbal component is also scored for elaboration. The Torrance Test has excellent content and construct validity compared with most other creativity tests and has scored higher than other tests on a number of predictive validity measures.

Is creativity, like IQ, something that remains relatively static throughout one's life, or can a person's creativity be improved? There are a number of curricula available that are designed to increase aspects of creativity. Most equate creativity to divergent thinking, deriving multiple solutions to a single problem, and work to increase that aspect of creativity. The methods of training in these curricula are varied, including audiotapes, comic books, workbooks, and direct teaching of skills. Most procedures include instructions as to the importance of creative thinking and include skill practice as the primary activity in training.

Some research regarding the effectiveness of these training programs shows an increase in students' scores on tests of divergent thinking. Although these results may seem promising, students are generally tested using materials that are very much like the training materials. There is little research to show that the positive effects of training generalize beyond these materials.

The most successful results to date come from interventions designed to increase individual aspects of creativity through reinforcement. A number of studies conducted in the 1970s increased diverse and novel behavior by praising behavior that had not previously been seen in the student within the session. Some of the behaviors increased were block building, drawing, constructing tools, creative writing, and painting. Through descriptive social reinforcement, novelty and diversity of behaviors increased substantially. In 1976, Glover and Gary increased each of the four aspects of creativity listed above: originality, fluency, flexibility, and elaboration in a group of fourth- and fifth-grade students. When points were given for fluency, that aspect of students' writing improved. As each aspect of creativity was systematically rewarded, that aspect and only that aspect of students' writing improved. As with the broader, multicomponent curricula, the generality of these effects is largely unknown.

SUMMARY

Creativity has been defined a number of different ways. Most commonly, though, it has been identified with the novelty and originality born of problem solving through divergent thinking. Divergent thinking has been further broken down into four components: fluency, producing a number of responses within a given time; flexibility, producing different types of responses; originality, producing responses that differ from peers, society, or individual history of responding;

and elaboration, producing responses that are sufficiently complex and multifaceted.

Once creativity has been broken down into observable behaviors, it becomes possible to test for this performance and to train individuals and groups to increase the behaviors determined to be creative. From early preschool and into adulthood, it is clear that creative behavior can be influenced by the environment. The challenge of tomorrow will be designing classrooms and work environments that will promote creativity in our daily lives.

—Jill M. White and Gregory P. Hanley

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CREUTZFELDT-JAKOB DISEASE

Creutzfeldt-Jakob Disease (CJD) is a rare, devastating, degenerative, and mostly fatal brain disorder. It is part of a group of diseases called prion diseases that occurs in humans and certain animals. The leading scientific theory at this time maintains that CJD is caused by a type of protein called a prion.

This group of diseases first came to the public attention in the mid-1980s as a result of the outbreak of bovine spongioform encephalopathy (BSE) in the United Kingdom. BSE is a prion disease in cattle. Tissue from infected animals may have been used in animal feed, leading to the spread of the disease and growing concern over whether this disease could pass to humans.

In humans, the most widely known of the prion diseases is CJD, which affects around one person per million per year. In the United States, around 250 to 300 new cases are reported per year. There are three major categories of CJD: inherited, sporadic, and acquired. These categories mainly refer to the way the disease was acquired rather than the symptoms that accompany the disease. One of the variant types of acquired CJD observed in younger populations (ages 16–39), variant Creutzfeldt-Jakob disease (vCJD), has been associated with the consumption of beef and beef products from animals infected with BSE. In an animal infected with BSE, prions are concentrated in two areas of the body: the nervous system tissues, including the brain, spinal cord, and eyes, and the lymphatic tissues, such as the lymph nodes, bone marrow, and spleen. The greatest risk according to the Mayo Clinic for acquiring vCJD is associated with ingesting these tissues from BSE-infected cattle. At this time, there is no evidence that milk products from a BSE-infected animal pose a risk to humans. However, according to the Centers for Disease Control and Prevention, there is no precise method for determining the risk for acquiring this variant form of CJD from eating beef and beef products from cattle in countries that have reported confirmed cases of BSE.

There is no single diagnostic test for the diagnosis of CJD at this time. The only way to conclusively diagnose CJD is through a brain biopsy or autopsy. A brain biopsy is a highly invasive procedure and involves removing a small piece of tissue from the patient's brain so that it can be examined by a neurologist. Due to the invasive nature of this procedure coupled with the fact that a correct diagnosis of CJD does not help in the treatment or prognosis of the disease, a brain biopsy is discouraged. When autopsies have been performed on individuals that suffered from CJD, the brain tissue looks "spongy" because it is punctured by many tiny holes where cells have been damaged.

With CJD, typically the symptoms begin between ages 45 and 75. In the early stages of the disease, patients may have significant memory problems and may demonstrate changes in their behavior, lack of coordination, and visual disturbances. As the illness progresses, mental deterioration becomes the primary symptom, with observed involuntary movements, blindness, weakness of the extremities, and possibly coma. As mentioned above, this disease is fatal and about 90% of patients die within 1 year.

What can be done for individuals suffering from CJD? Currently there is no treatment or medication that can cure CJD. Most treatments are aimed at alleviating the symptoms experienced and helping the patient feel as comfortable and pain free as possible. Opiate drugs are frequently used because they can help relieve the pain, and the drugs clonazepam and sodium valproate may help relieve involuntary muscle jerks.

In conclusion, CJD is a very potent and fatal brain disorder thought to be caused by proteins called prions. It affects mainly individuals between 45 and 75 years of age, but the newest variant of the disease (vCJD) has been observed in younger individuals (ages 16–39). There is no specific procedure to diagnose CJD other than a brain biopsy or autopsy. Since this disease is not curable, treatments center around making the patient more comfortable and reducing the pain.

—Natalie N. Politikos

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CRITERION-REFERENCED TESTS

Whether it is in a classroom setting, a requirement for college admission, or to acquire something as simple as a driver's license, few individuals in today's society can avoid the necessity of taking tests. The scores received on these tests say something about what we know. Our knowledge level, as measured by the test, can either provide comparison with other individuals as a relative standard or with an absolute or predetermined standard. When an individual's performance on an examination is compared with a predetermined or absolute standard, it is called a criterion-referenced test.

Although the notion of taking a test has not changed, the way we develop and interpret tests has changed drastically over the past 40 to 50 years. One of those drastic changes began taking shape in the early 1960s, when a gentleman named Robert Glaser coined the phrase *criterion-referenced measurement* and wrote about the distinction between a norm-referenced and criterion-referenced measurement. Up until that time, the use of norm-referenced tests, which compare examinees with a relative standard, was the customary model. Since the early 1960s, when criterion-referenced measurement was introduced, the procedures associated with development and use of criterion-referenced tests have been refined into well-accepted practice.

The purpose of a criterion-referenced test is to measure an individual's level of skill or mastery over a specific body of knowledge being represented by the test. As a result, there are certain design characteristics that must be considered when developing criterion-referenced tests. First we must consider what material the examination should cover. Because we want to be able to make inferences from test performance about mastery, subject matter covered in a criterion-referenced test needs to be dictated by specific goals, instructional objectives, or outcomes that accurately and narrowly define the domain. The format and number of items written for the examination must be a representative sampling from the content area over which we are determining mastery. The final piece in the development of a criterion-referenced test involves setting the performance standard or cutoff score. There are many descriptive phrases associated with criterion-referenced test results that categorize examinees. Examples include, pass/fail, mastery/nonmastery, certified/not certified, licensed/not licensed, and proficient/not proficient. The setting of the performance standard, or cutoff score, allows us to know at exactly what point that decision should be made for the individual test taker.

Criterion-referenced tests are useful when we want to make inferences from test performance about what a person can do. Success on a criterion-referenced test does not imply perfect knowledge; rather, it implies that an individual has met the established performance standard. The examinee, at this point, has demonstrated an acceptable level of the skills and abilities required to be considered a master, proficient, or certified.

Everyday examples of criterion-referenced tests abound. During the elementary school years, there are tests to determine something as simple as whether or not students can tell time or whether or not they know foundational mathematical concepts such as multiplication tables. A few years later, most people take a criterion-referenced test to obtain a driver's license, demonstrating that they have the acceptable skills to safely operate a vehicle on the roadway. Upon entering the workforce many members of our society are required to pass a criterion-referenced test in order to

enter their chosen profession, such as physicians proving that they are capable of caring for and treating patients appropriately.

Few stages of life are exempt from criterion-referenced testing in one form or another. Due to the increased demand for testing in general, and the immense practicality of criterion-referenced testing, its place in the measurement arena is guaranteed.

—Dawn B. Clayton

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CRITICAL PERIOD

Critical and sensitive periods are times when development of a particular area may be most influenced by environmental factors. The terms may be confusing, particularly when applied to behavior, because they do not have commonly accepted meaning and the research designs required to demonstrate them behaviorally can rarely be conducted. Strictly, critical periods are relatively brief and discrete times when particular experiences have irreversible effects regardless of subsequent experience. Effects may be due to the absence of normal, or presence of abnormal, experience. Originating in embryology, they have been applied to numerous areas of human development, including socialization, personality, language, and cognition. The concept is closely related to claims that early experience, as opposed to merely prior experience, has lasting impact on the organism. Critical/sensitive periods are often viewed as "windows of opportunity." Only when the windows are open can environmental factors influence development. However, as Bateson suggested, such "opened or closed" views of the effects of timing of experience on development are oversimplified when applied to complex behavior.

HISTORICAL OVERVIEW

The embryological critical/sensitive period concept originated in two classic research programs in the 1920 and 1930s:

1. Working with fish embryos, Stockard (1921) found that physical and chemical agents created "monsters" if presented during rapid cell proliferation and differentiation, but had essentially no effect if presented earlier or later. Permanent damage occurred when an agent interrupted normal development during "sensitive periods" or "critical moments."

2. Studying differentiation in amphibian embryos, Spemann (1938) transplanted cells at various times from their original donor site to a different host site. Cells transplanted early developed appropriate to the host site, whereas those transplanted later developed appropriate to the donor site. Equipotential development was followed by determined development. Spemann viewed differentiation as a process of "cellular induction" occurring during a "critical period" in normal development.

The critical period concept quickly became applied to behavior. Lorenz apparently first used it in 1937 in his account of imprinting, the process through which newly hatched precocial birds presumably develop filial attachments and species identification (but see Gottlieb for an alternative approach). He suggested that imprinting's "two chief characteristics," restriction to a narrow time period and irreversibility, were "in common with Spemann's inductive determination. . . ." In 1962, Scott stated, "Critical periods determine the direction of social, intellectual, and emotional development." For Scott, experience during such periods influenced development in at least two ways: (1) acting at a "turning point" leading toward normal or abnormal development, and (2) producing an irreversible effect that subsequent experience cannot modify. Essentially, experience at a critical time directed the organism down a particular one-way developmental path. Scott's general principle of organization suggested that as any system becomes organized, from differentiating embryonic cells to developing behavior patterns of young animals, reorganization of the system becomes progressively more difficult. That is, "organization inhibits reorganization."

Indeed, he claimed that major modification can occur only during organization.

Other mid–20th century factors brought critical periods to wide attention. Consider:

1. They fit with Freudian psychodynamic theory's emphasis on the role of early experience in determining personality, then dominant in many areas of psychology and psychiatry.

2. In his influential 1951 review of maternal deprivation, Bowlby stated that depriving young children of maternal care for a prolonged period may have lifelong adverse consequences: "[I]t is a proposition exactly similar in form to those regarding the evil after-effects of rubella in foetal life. . . ."

3. Hebb's theory proposed that first learning was necessary for optimal brain development and functioning.

4. Lenneberg (1967) proposed a critical period for language acquisition. Its beginning owed to lack of maturation, and its end apparently "related to a loss of adaptability and inability for reorganization in the brain. . . ."

5. A variety of experimental nonhuman research supported the apparent existence of critical periods. For example, infant rats reared in enriched environments had larger brains and better problem-solving abilities than those raised in restricted environments, female goats needed contact with their newborn kids to develop maternal attachment, Harlow's infant monkeys deprived of maternal care showed aberrant social behavior, young songbirds needed particular early experience to develop normal song, and early hormone manipulation permanently modified sexual behavior in rodents. The latter is of particular interest because it clearly demonstrated the importance of timing: Testosterone injections in newborn female rats or castration of newborn male rats produced opposite-sex behavior (with appropriate hormone replacement) in adulthood, whereas similar manipulations even in later infancy had no such effect. Some of this research is reprinted in books of readings edited by Denenberg and Scott.

CURRENT EMBRYOLOGICAL CONCEPT

Critical/sensitive periods are associated with the development of virtually all organ systems. In this section, *critical period* and *sensitive period* refer to times when teratogens may cause major morphological damage and minor morphological/functional damage, respectively, as suggested by Moore and Persaud, who have an excellent figure of human critical/sensitive periods. The embryonic period in humans is often described as "*the* critical period" since most organogenesis and severe effects of teratogens occur then. Such a description is oversimplified, however, because critical periods for various organ systems have different onsets and durations. The longest, for the central nervous system (CNS), extends to the 16th week of pregnancy, well into the fetal period. Sensitive periods for four systems—CNS, eyes, teeth, and external genitalia—extend for years after birth, resulting in potential adverse effects of abnormal environmental influences or positive effects of supportive environmental influences well into childhood or adolescence. Examples of adverse effects include effects of tetracycline in infancy/early childhood on mottling of permanent teeth and of heavy metals and infections on CNS development. Examples of positive effects include early surgical removal of congenital cataracts on visual acuity and depth/pattern perception and a low phenylalanine diet in infancy on CNS development of those with phenylketonuria.

Critical periods for components of organ systems are more circumscribed. Perhaps most dramatically, thalidomide's teratogenic effects were limited to 34 to 50 days past the last menstrual period. Ingestion at 34 to 38 days was associated with absence of external ears, whereas ingestion at 38 to 48 days was associated with a complex of malformations, including absence or severe shortening of arms and legs (phocomelia), malformed ears, and hip dislocation. Differing critical periods can make diagnosis of teratogenic syndromes difficult. For example, fetal alcohol syndrome (FAS) is classically diagnosed through a triad of characteristics: facial abnormalities, growth retardation, and CNS dysfunction. Since the critical period for facial features is far shorter than that for the CNS, children whose mothers drank heavily after the end of the critical period for facial features may show serious cognitive and behavioral deficiencies but normal facies. Such children may not meet FAS diagnostic criteria.

CURRENT BEHAVIORAL CONCEPT

Many researchers question the value of applying a strict critical period concept to behavioral development. Some supposed critical periods are neither as circumscribed nor as irreversible as originally claimed. Lorenz, Scott, and Bowlby and others appear to have overstated the parallels between the effects of timing of experience in embyrogenesis and those on behavioral development. For example, under certain experimental conditions, imprinting can occur well beyond the

normal end of its "critical period" and can be reversed from one object to another. A critical period for development of human attachment has been questioned both by methodological criticism of early research and by recent findings that some children adopted after extensive early deprivation develop appropriate attachment and social behavior. Little evidence supports the claim that the first 3 years of human life are truly critical for later development, although of undoubted importance. Thus, numerous authors, including Bailey, Bruer, Symons, and Lichtman; Bateson; Bornstein; Bruer; Huttenlocher; and Shonkoff and Phillips, have suggested that *critical period,* implying discrete length and irreversibility, be replaced with the more flexible *sensitive period* to describe effects of timing on behavior.

Direct and indirect evidence supports important roles of such sensitive periods in human development. Noninvasive methods of studying brain structure and function are revealing a variety of periods of rapid postnatal brain development and synaptic pruning, particularly experience-expectant ones. Behavioral as well as neurological evidence exists for sensitive periods in development of components of sensory systems, first language learning, motor behavior, and other areas associated with early brain plasticity. Furthermore, aberrant early relationships and other experiences can have broad adverse long-term effects on children, although the underlying processes are not well understood. The complex effects of early experience can be seen in ongoing publications of the NICHD Study of Early Child Care and Youth Development (http://secc.rti.org/home.cfm). As Bateson suggested, no single window of opportunity applies to timing of environmental influence. Critical/sensitive periods are of different types, lengths, rates of onset and offset, and underlying processes. Bornstein thoughtfully reviews and analyzes these issues. They are also subject to individual differences and different environmental conditions.

—Robert T. Brown

See also Continuity and Discontinuity in Development, Sensitive Period

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CROSS-CULTURAL DEVELOPMENT

Everyone is born into a cultural environment. Cultures vary widely in belief systems, settings, languages, and processes of transmission, such as child socialization and teaching. Culture also provides a set of "rules" for interaction and a kind of blueprint for human development. The study of cross-cultural development is concerned with the varieties of human behavior across time and across cultural places.

WHAT IS CULTURE?

Culture and ethnicity are often used interchangeably without distinction. Ethnicity is the label one uses to identify one's social identity, usually defined as race, national origin, or religion. Culture can be thought of as the set of beliefs, values, and practices of a particular group that are transmitted across

generations. Culture is dynamic, constantly shaped, and produced by members of its group.

Culture has qualities that are internal, external, and interactive. Internal qualities to the individual include knowledge, skills, and values. External qualities to the individual include tools or institutions. Culture has an interactive nature as well, such as shared social activities among people. The role of culture in behavior is pervasive and should be considered in any examination of human development across the life span.

WHAT IS HUMAN DEVELOPMENT AND WHY IS CULTURE AN IMPORTANT PART OF IT?

Human development can be understood as the lifelong interactional processes of perceiving and experiencing culture as triggered from the outside, shaped from the inside in one's mind, and cocreated with others in interaction. In other words, developmental and cultural processes are constantly intertwined. Groups of people share culture and negotiate cultural issues. At the same time, culture is subjectively experienced by the individual. Cultural experiences vary even among members of the same group.

Early studies of cross-cultural development were often ethnocentric, using the researchers' own values, beliefs, and practices as the standard for interpreting and evaluating the developmental processes and outcomes in other cultural groups. More recently, researchers have emphasized that every cultural group has its own standard and should be interpreted in its own right. This includes not only research that is conducted across cultures with national boundaries, but also for diverse cultural groups within a single society.

SYSTEMS IN THE STUDY OF CROSS-CULTURAL DEVELOPMENT

The developmental niche is a useful theoretical framework proposed by Charles Super and Sara Harkness to integrate findings across cultures and disciplines. The developmental niche is composed of three interacting subsystems surrounding the child: the settings in which the child participates, the psychology of the caretakers, and the customs of the community regarding child care.

Settings in Which the Child Participates

Children develop by increasing their participation in cultural activities of multiple settings. This development occurs as activities in one's daily experiences help to build the cultural beliefs and values under which the person operates. Culture becomes a kind of software built into the hardware of the biological system of the human body. The software is built through everyday interactions and practices that shape development, such as schooling, reading and writing, playing sports, carpentry, or weaving. The ways that children are engaged in these and other kinds of activities provide clues as to the rules for human behavior in a particular cultural place.

The Psychology of the Caretakers

Parental goals vary across cultures, and they shape child care practices and outcomes. Robert LeVine proposed a universal hierarchy of parental goals. Once parents have ensured the survival and health of their children, they can focus on training children in skills needed for adult life, such as providing food, shelter, and clothing for themselves and a future potential family. Upon meeting these parental goals, they can then focus on ensuring that children are involved in activities to learn the cultural values of their group. In the case where child survival is low, parents may not reach the last goal because they will spend much of their efforts reaching the first goal of ensuring child survival.

Customs for Child Care

Cultures differ widely in child-rearing practices. A predominant practice for many in the United States is to provide infants with active stimulation in cognitive and social areas. Cognitive stimulation is provided in the form of toys that teach or build skills of reading or counting; social stimulation is provided with a great deal of face-to-face contact and talk to babies and children.

In many of the world's cultures, however, there is a belief that children should not be actively stimulated, and child-centered conversations are minimal. For example, in the Gusii culture of Kenya, there is a predominant belief that infants can be easily overstimulated and that this can lead to illness. As such, low levels of cognitive and social stimulation are provided to infants; parents rarely speak directly to infants, they avoid eye contact, and they are careful not to excite infants' emotional responses. Although there are differences between the Gusii and Americans, children grow up with a sense of emotional well-being in either cultural context.

DOMAINS OF STUDY IN CROSS-CULTURAL DEVELOPMENT

Cross-cultural researchers focus on understanding the cognitive and social domains of development. Research on cognitive development across cultures has included schooling, literacy, categorization, counting, and the use of tools. The use of tools can vary widely across cultures, and it can influence the ways that people think about the world. Familiarity with the cognitive goals of a cultural group helps researchers to avoid underestimating children's abilities. For example, among Maya children of Mexico, Ashley Maynard and Patricia Greenfield found that those children who knew how to weave performed better on a task of cognitive development that tapped weaving knowledge than they did on a task that tapped the same underlying knowledge, but in a different format.

Cross-cultural researchers also study social development. Areas of study include attachment, friendship, peers, and parent-child interactions. Attachment is a universal process by which infants and caregivers build close bonds with one another. The cross-cultural study of attachment has shown that the different patterns across cultures can be attributed to the dissimilarity of cultural goals across groups. In some cultures, such as the European-American middle class, the goal of the attachment relationship is to maximize children's independence, and the baby sleeps in a separate crib in a separate room. In other cultures, such as the Maya of Mexico, the goal of the attachment relationship is to encourage children's interdependence, so that the baby sleeps with the mother and is carried during much of the day on the caregiver's body.

APPLICATION TO MINORITY IMMIGRANT CHILDREN

The study of cross-cultural development has implications for understanding the development of minority immigrant children. Historically, studies on the developmental processes of immigrant and minority children have followed a "deficit" model. This model takes mainstream cultural values as the standard for evaluating minority/immigrant children's behaviors. For example, immigrant students' lack of eye contact while interacting with teachers at school is sometimes interpreted as students' lack of self-confidence or unassertiveness. Yet, immigrant parents transmit to their children the cultural belief that looking directly at authority figures signals disrespect.

Ancestral values of minority groups in the United States and other multicultural societies shape the distinct patterns of socialization and development. For example, the values of ancestral homelands influence immigrant parents' participation in their children's schooling. Compared with the mainstream American value that places emphasis on parental participation to ensure children's school success, many recent Latino immigrant parents believe that teachers alone are responsible for children's schooling and that they should not micromanage it. Despite the fact that immigrant parents are likely to value education as highly as other parents, immigrant parents' lack of direct participation in children's schooling is often interpreted by teachers and administrators as lack of advocacy and support for their children's educational endeavors.

It is also important to recognize a power dynamic between ethnic groups, because the relationship between dominant and less dominant groups has an impact on development. For instance, social science curriculum in high schools is more likely to emphasize and to reflect the experiences of the majority rather than minority groups in the United States. To move away from this deficit model of educating minority children, it is important to incorporate the child's cultural values or language in school curriculum. Recent findings show, for example, that bilingual education that incorporates children's heritage language in instruction can actually improve their mastery of the English language. It was long believed, however, that "English-only" language instruction was critical for children's mastery of the English language.

SUMMARY

The study of cross-cultural development generates knowledge about developmental processes and experiences in different cultures around the world. Cross-cultural researchers also generate findings about the minority and immigrant groups and about the interactions of different cultural groups when they come together. This knowledge is used to advance our study of development more generally.

In an age of increasing globalization, the study of cross-cultural development is central to our understanding of the variety of experiences available to people around the world, the varying pathways for development, and the increasing diversity of many multicultural societies. Understanding the cultural

variation in developmental processes furthers the understanding of the underlying construct itself.

—Ashley E. Maynard and Su Yeong Kim

See also Longitudinal Research

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CROSS-SECTIONAL RESEARCH

The longitudinal method examines one group of people repeatedly over time, whereas the cross-sectional method examines several groups of people at one point in time. For example, if you investigated changes in social behavior in 20-, 30-, and 40-year-olds all measured at one point in time, you would be conducting a cross-sectional research study. In other words, cross-sectional studies examine age differences, while longitudinal studies measure age changes.

As with the longitudinal approach, the cross-sectional approach has its advantages and disadvantages. Advantages are that it is relatively inexpensive in that it usually does not take a long time to complete, it takes place over a relatively short span of time so it is easier for participants to cooperate, it has a low dropout rate since it does take place over shorter period of time, and problems with staff retention are minimized since turnover is greatly reduced.

Cross-sectional research designs have their disadvantages as well. For example, it makes comparisons of groups difficult since all the data are collected at one point in time, it provides little idea as to the direction of change that a group might take (there are no previous data as in a longitudinal study), it examines people of the same chronological age who may be of different maturational levels, and reveals nothing about the continuity of development on an individual basis. The most serious disadvantage is the lack of comparability of groups, because the only thing they differ on is age.

Finally, cross-sectional research strategies suffer since cohort (the year in which participants are born) and age are confounded, meaning that the effects of the two cannot be separated. One does not know whether any age-related changes are in fact a function of changes in age versus a difference in the years in which the participants were born. Even with these shortcomings, along with longitudinal research designs, cross-sectional research designs are very popular.

—Neil J. Salkind

See also Longitudinal Research

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CRYING

Crying is not just the sound of a fussy baby or a bothersome noise. It is a direct and effective way that the young child communicates. For preverbal children, crying is definitely language.

Crying is an important part of the infant's earliest communication system that is used to convey various demands and needs, such as hunger or thirst, or pain from colic or teething. If they are well fed and warm, crying babies are most likely in pain, or at least uncomfortable, and it is unjust to grow suspicious of

their motives when they promptly stop crying on being picked up.

The infant's cry also seems to take on a special, distinctive quality, and there are a variety of factors affecting how well parents can discriminate cries, including the experience of the listener, the age of the baby, the type of cry (e.g., hungry or tired), how typical the cry is, and the length of the crying episode. With all these variables being important, it is easy to see why there can be differences in the way parents react to crying. In fact, many new parents learn their child's individual crying patterns very quickly and can even recognize them during the first month of life. They regularly report how they can easily tolerate the crying of other infants, but not their own.

Infant crying can also be a provocative and often unpleasant experience, probably because it is supposed to evoke caregiving behaviors from adults. In one study of 50 mother-infant pairs, the promptness with which mothers responded to their infant's crying was studied. The results showed that the average duration of crying was reduced by about one half over the 9-month length of the experiment, but that the number of crying instances remained about the same. So children cried for less time each time they cried, but continued to cry the same number of times. Most interesting is that delay of maternal responses reduced the number of crying bouts, contrary to the results of earlier experiments.

The pattern of cries and their significance become terribly important for the development of reciprocity between the parent and the child. First, the crying establishes a social link. More important, however, is that the very act of crying makes the infant more aware of the physical apparatus necessary to make sounds. When infants are about to talk, their spurts of crying take on the same duration as first words, so they develop a rhythm of communication that up to now has been much more unsystematic.

Ignoring prolonged crying entails the risk for missing a potentially important warning. A touch of hoarseness in the crying may mark the beginning of a croup attack with its characteristic barking cough. Some researchers suggest that the crying of babies who are ill may be unique among other cries to signal that special attention might be needed. For example, Zeskind and Lester found that certain high-risk children have distinctive features about their crying, and other researchers found that cries of Down syndrome children are more unpleasant than those of normal children.

Persistent crying has also been a focus of research. Persistent crying has been tied to family disruptions and child abuse. If you have ever had to face a baby who just will not quit (and you had no one to relieve you), you would understand how frustrating this situation can be.

Ignoring crying can have other consequences as well, both positive and negative. If the child is continuously ignored, he or she will learn not to place trust in others in an "unsafe" world. If the crying is responded to without any crimination, the child could end up not learning how to deal with frustration.

—Neil J. Salkind

See also Infancy

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CRYSTALLIZED INTELLIGENCE

The notion of crystallized intelligence was first proposed by the British psychologist Raymond B. Cattell in a 1943 article in which he outlined his perspective on the structure of intelligence, a perspective born of his efforts to develop a culture-free intelligence measure. Cattell's theory initially suggested that general intelligence could be conceptually subdivided into two related but distinct components, namely, fluid intelligence (Gf) and crystallized intelligence (Gc). In collaboration with J. L. Horn, Cattell expanded his theory by including additional cognitive abilities; this revised model came to be known as the Cattell-Horn theory. A further extension of the Gf-Gc theory—postulated by John B. Carroll on the basis of a survey of more than 60 years of factor analytic research on

human cognitive abilities and published in 1993—provides one of the most comprehensive and integrated treatments on the subject. Carroll's three-tiered taxonomy of cognitive abilities, known as the Cattell-Horn-Carroll model, is a fully hierarchical structure, with the general ability factor (g) at the top, Gf and Gc along with several other factors at an intermediate level, and many more specific factors at the lowest level of the hierarchy. Both the original version of Gf-Gc theory as well as its extensions have proved to be quite influential in the development of modern tests of cognitive abilities.

Cattell believed that psychometric intelligence, as reflected in mental ability tests, is a composite of two major factors. Fluid intelligence comes into play when individuals are confronted with unfamiliar tasks or tasks that require novel solutions. Crystallized intelligence, on the other hand, is displayed on tasks that require the recall of acquired knowledge or the application of well-learned skills. This differentiation is, by Cattell's own admission, reminiscent of D. O. Hebb's distinction between biologically determined capacity, or intelligence A, and the capacities that are acquired through experience and education, or intelligence B. It is also similar to the familiar continuum along which tests of ability can be placed—ranging from achievement-oriented to general ability or aptitude measures—depending on the degree of experiential specificity they assume in prospective test takers.

Although the fluid (Gf) and crystallized (Gc) components of intelligence are conceptualized as being interrelated, they tend to become increasingly more independent as development proceeds from infancy through adulthood. Crystallized abilities are derived from fluid abilities, but are developed through education, experience, and practice. As a general rule, fluid intelligence shows a steady decline in adulthood, whereas crystallized intelligence—which reflects the extent of acculturation—can slowly improve over one's life span.

Another important distinction between crystallized and fluid intelligence is in their susceptibility to brain injury. Performance on measures of fluid intelligence, such as series completion and analogies tests, tends to be more affected by damage to the brain, regardless of where the damage occurs. On the other hand, measures of crystallized intelligence—such as tests of verbal comprehension and content knowledge in specific fields—are more affected by damage to the brain areas associated with those abilities.

At present, the expanded model of Gf-Gc theory is very popular and is widely used in research studies on intelligence because of its ability to account for new empirical data. Variations of the Gf-Gc model have also been explicitly incorporated into the design of assessment instruments developed by Alan and Nadeen Kaufman, such as the Kaufman Adolescent and Adult Intelligence Test (KAIT) and the Kaufman Assessment Battery for Children-Second Edition (KABC-II), as well as other contemporary test batteries, such as the Woodcock-Johnson III. In addition, Flanagan and coworkers have applied their Gf-Gc cross-battery assessment approach to the interpretation of the Wechsler Intelligence Scales (WAIS, WISC, and WPPSI).

—Susana Urbina and Laura Henderson

See also Fluid Intelligence, Intelligence

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CYSTIC FIBROSIS

Cystic fibrosis (CF) is a recessive hereditary disease that causes the mucous glands in the lungs and digestive tract to secrete unusually thick and sticky mucus. Instead of acting as a lubricant, these secretions clog the lungs and prohibit the pancreas from working efficiently, resulting in a number of secondary illness characteristics. CF affects approximately 30,000 people in the United States, and an additional 10 million are unaware that they are symptomless carriers of the disease. Because CF is an autosomal-recessive disorder, two recessive genes for the disease (one from each parent) are required for symptoms to develop.

Symptoms of CF include coughing and wheezing, poor digestive ability, salty-tasting skin, nose polyps, reduced growth, and infertility. There are thousands of mutations of the CF gene, which results in varied symptoms within the CF population. Adult CF patients also deal with health issues such as related diabetes and osteoporosis.

Treatment of CF varies with the range of symptoms and the stage of the disease. Mucus clearing of the lungs is a common, daily treatment for CF patients. Other treatments include antibiotics for lung infections, drugs that thin mucus for better lung functioning and fewer infections, and pancreatic enzyme supplements. Individuals with CF are also advised to be physically active and to adhere to a nutritious (often high-calorie) diet. People who have been diagnosed with CF have a mean survival age of 33.4 years. However, recent advances in available treatments have resulted in an increased life span for those suffering with CF.

CF patients may suffer from psychological issues related to the disease. For instance, patients of all ages can have difficulty coping with living with their disease. CF patients may have problems sleeping and may withdraw socially. Other psychological problems could be present because of anxiety-provoking medical visits and prolonged hospital stays related to the illness. Social issues that arise surround the problems or stigma that might shroud the CF patient because of coughing, wheezing, and medication noticed by peers.

There may be special psychological issues related to children diagnosed with CF. Children may have difficulty understanding their diagnosis. Many children with CF may also have problems with developmental tasks because of the nature of the illness and the treatment regimens. In addition, there are often problems in adherence to treatment regimens, which can possibly lead to decreased pulmonary functioning. Some children with CF also exhibit behavioral problems that may be related to their condition and management of their disease. Many children face problems with their education due to illness and hospitalization resulting in missed schoolwork and fewer social interactions with children. In adolescence, CF patients may face increased anxiety and apprehension as their responsibility for their treatment increases. There are also possible issues with independence, feeling accepted by peer groups, and issues with planning realistically for the future. Infertility becomes an issue as individuals with CF age. Men with CF can become sterile, and women often find it difficult to carry a fetus full term because of limited lung capacity and other related problems. The CF patient may also battle with the decision of having children and possibly passing on the CF gene.

Early intervention is important so that CF patients can have the appropriate support during various times of need from the onset of their illness. It is crucial that early intervention is provided by individuals knowledgeable in the emotional and social aspects of living with CF.

There is currently no cure for CF, although medical advances have allowed those with CF to live longer and more comfortable lives. Quality of life for CF patients continues to improve, making the diagnosis of CF less inhibiting than in previous years. Although more research needs to be done from a medical and psychological aspect of CF, the outlook of the illness continues to look more and more positive.

—Lana S. Olivo and Ric G. Steele

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D

Death

As a well-spent day brings happy sleep, so life well used brings happy death.

—Leonardo da Vinci

DARWIN, CHARLES (1809–1882)

Charles Darwin developed the theory of evolution by natural and sexual selection, which today unifies the life sciences. He was born in Shrewsbury, England. After graduating from Cambridge, Darwin embarked on the *H.M.S. Beagle* for a British scientific expedition to map the coastline of southern South America. As the resident naturalist, Darwin collected specimens and recorded observations of plants, animals, fossils, geological features, minerals, native peoples, and other items of interest.

Darwin's observations led him to speculate on a wide range of biological and other phenomena, including plate tectonics and the origins of coral reefs. The Galapagos Islands provided Darwin with a natural laboratory that was a particular influence in guiding his theory of natural selection, harboring many species of plants and animals that were similar to those on the mainland, but varied in remarkable ways. At the time, species of organisms were considered to be a primeval archetype, divinely created and unchanging. Variation was seen as noise imposed on the platonic ideal. It was also a common belief that one species was created to benefit others, for example, providing food.

Following Malthus, Darwin recognized the struggle among individuals for existence and limited resources. He also believed that the phenotypic variation of individuals, enabling some individuals to survive and reproduce more successfully than others, was partially heritable. He inferred that natural selection would over the course of time encourage the spread of traits that are more adaptive than others. Darwin published *On the Origin of the Species* in 1859, followed by *The Descent of Man, and Selection in Relation to Sex* in 1871, which outlined the principles of sexual selection. Sexual selection resolved phenomena puzzling to Darwin, describing how traits appearing to be detrimental to survival are beneficial in the competition for mates. Darwin went to great lengths to test the central predictions of his theory; he recognized how controversial his ideas might be, and tremendous amounts of evidence have since been amassed in support of his theories.

Darwin has made a tremendous impact in science, including psychological areas as diverse as the function and universality of emotions and the development of intelligence and imagination. In recent decades, increasing numbers of psychologists have been explicitly employing an evolutionary approach to understanding human thought and behavior. The recognition that proximate psychological mechanisms

serve ultimate adaptive functions holds the promise of uniting the disparate areas of psychology in a Darwinian framework.

—Daniel J. Kruger

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DATING

CHANGING NATURE OF DATING ACROSS HISTORY

The definition and practice of dating continues to change across time and varies significantly among different cultures. For example, in 1977, according to *Webster's New Collegiate Dictionary,* dating in the United States was defined as a "social engagement between two people of the opposite sex."

Recently, however, this definition of dating in the United States has been modified in several ways. First, the construct of dating is no longer restricted to heterosexual interactions; instead, it can also transpire between two individuals of the same sex. At present, dating can also take place in groups rather than being restricted to a dyadic exchange. Furthermore, although dating is still considered a social engagement, this interaction no longer has to occur in person. In current culture, dating can, and often does, take place over the Internet or via some other type of technology. Today's dating can also occur in a variety of novel contexts such as part of a television reality show, as a result of joining a dating service, or as a consequence of placing a personal advertisement in a newspaper or another print medium.

Finally, while most empirical studies have focused on the dating behaviors of adolescents and never-married young adults, because of changing demographics in the United States, which include later marital age, increased frequency of divorce, and the aging of the American population, dating is now an activity that includes people of all ages. In fact, even married couples have been admonished by the popular press to "keep dating" in order to keep the romance alive.

Dating among older Americans has some distinctly different features when compared with adolescent dating. For example, 50% of men 40 to 69 years of age date women 5 or more years younger than themselves, whereas less than 20% of women in this age group date men 5 or more years younger than themselves. Some gender differences in dating attitudes are also apparent among older daters. Men in this age group are 10 times more likely than women in this age group to think that sex on the first date is acceptable.

Therefore, to better encompass the current dimensions of dating, in the 2001 version of the *New Oxford American Dictionary,* the word *date* was redefined more broadly as "a special or romantic appointment or engagement," while *dating* was articulated as the process of "going out with someone in whom one is romantically or sexually interested," regardless of whether the individuals who are dating are heterosexual, homosexual, or bisexual, adolescent or older, in person or via the Internet, or single, divorced, or married.

To add complexity to the issue, debate exists about the extent to which both participants in the social engagement must agree that the shared event is a "date." According to adolescent self-report, being "in love" corresponded to being in a reciprocal love relationship only about half the time. In 1991, Sugarman and Hotaling theorized that dating can be said to occur in interactions that are characterized by commitment, expectation of future interactions, and physical intimacy. In practice, however, the two parties on the date may have quite different opinions about their commitment level, their expectations for future interactions, and/or the degree to which they want to share or have already shared physical intimacy. Data confirm that there is significant variation along these three dimensions, even among events that are clearly designated by both participants as dates. Thus, there does not currently seem to be a uniformly agreed upon indication that a particular social interaction is, in fact, a date.

Disagreement in designating an engagement as a date appears to be particularly common in the initial stages of adolescent relationships. Typically, romantic interest is assumed on the part of the individual who initiated the date; however, the degree of interest experienced by the invitee can often remain unclear throughout the first date. Moreover, uncertainty about

commitment levels can continue throughout the dating relationship.

The language used to describe different types of dates has also changed significantly over time and tends to reflect cultural notions of dating. These dating descriptors provide dating partners and observers important information about the nature of the dating relationship, including its exclusivity, seriousness, and/or its inclusion of sexuality (e.g., one-night stand, blind date, friend with benefits, fling, prom date or dance date, going out, getting together, boyfriend/girlfriend, significant other, fiancée, and life partner).

Historically, dating has been viewed as the typical way to find a marriage partner in many cultures. As such, the nature of dating has changed in keeping with norms regarding the function and timing of marriage and the degree to which sexual experience is considered taboo premaritally. For example, in the early to middle 1900s, the typical age of marriage was in the early twenties and virginity prior to marriage was the norm. Adherence to traditional gender roles was socially expected during courtship. Correspondingly, during this period, most dates began with the man initiating the date with the woman. Female-initiated dates were atypical. In general, the rules of dating etiquette were well established and formed the basis of books as well as newspaper columns. Men were expected to plan dates and pay for them. A "gentleman" arrived on time, interacted politely with the women's parents, and displayed fine manners. Physical contact was expected to be either nonexistent or restricted to a light kiss goodnight after one of the early dates. The woman's role on the date was to maintain decorum, halt amorous advances, listen to her date, and dress appropriately for the occasion.

Ideals for age of dating onset and the types of dating permitted for each age were also clearly specified. For example, in a national advice column published in the *Ladies Home Journal* in the 1950s, girls 12 to 14 years of age could attend chaperoned parties at one another's homes; however, "solo" dates could not start until age 16 or later. Girls were also cautioned about dating boys who were more than 2 years older than themselves or who belonged to a different social group, religion, or race.

In the new millennium, dating continues to be a source of intimacy, support, and companionship for youth. Moreover, dating etiquette is still a prime subject of magazines, newspaper articles, and popular books. However, current literature describes today's dating as more casual, spontaneous, cooperative, and unrestricted than the dating that occurred 50 to 70 years ago. Dating one partner also occurs at an earlier age (often between the ages of 13 and 15), even though the current age of first marriage is later than it has been in previous decades. According to recent research, by age 16, 80% of adolescents have already experienced a significant romantic relationship within the preceding year.

These early adolescent dating relationships are generally short lived and less mature than later dating relationships. This has led theorists to view adolescent dating relationships as occurring along a continuum from close friendships, to casual dating, to exclusive dating. Similarly, Roche (1986) delineated a five-stage model of dating (dating with no particular affection; dating with affection but not love; dating and being in love; dating one person only and being in love; and, finally, engaged). Roche then demonstrated that men's and women's views of proper behavior also differed significantly by stage of dating.

The psychological nature of dating relationships also changes with increased age. Individuals describe their adolescent dating relationships as engulfing and meeting their needs for companionship, yet more problem-filled than adult relationships. In contrast, young adult dating relationships are described as more trustworthy, supportive, and stable than adolescent relationships. This suggests that there are both qualitative and quantitative differences in emotional involvement among different levels of dating relationships. However, across most time periods and throughout adolescence and young adulthood, dating has also consistently functioned as both a recreational event and as a means of learning about the opposite sex and how to behave with them. These latter definitions of dating highlight its important role in helping individuals develop social skills and mature into adults who are capable of both independence and interdependence.

IMPORTANCE FOR SOCIALIZATION

On this basis, adolescent dating has been recognized by scholars as an important developmental event. Generally, according to Hansen, Christopher, and Nangle (1992), all adolescent social interactions function to provide an emotional support system for youth while offering a venue in which adolescents can explore their morals and values and establish their own personal identity. In addition to these functions, adolescent dating relationships are thought to be

particularly critical in promoting interpersonal competence and adult-like social behavior; recreation and entertainment; enhancement of status within the peer group; enhancement of independence, which facilitates separation from the family of origin; a context for experimentation with sexual activity and sex role behaviors; and increased skills with relation to courtship and mate selection.

Of note within these functions is that adolescent dating has been explicitly tied to the developmental task of separation and individuation from the nuclear family. Specifically, employing a developmental-contextual perspective, Brown (1999) theorized that adolescents experience a four-step sequence in their development of romantic relationships. The first step is the initiation phase. This phase coincides with puberty and is a time when youth become reoriented to members of the opposite sex while expanding self-concept. Dating during this phase typically occurs in groups and consists of unplanned meetings or casual interactions. The focus of the initiation phase is on the self.

The second stage is the status phase. During this phase, adolescents experience peer pressure related to whom they are dating and what kind of dating relationship they are involved in. By the end of this phase, it is expected that adolescents will have gained relationship skills and will be more willing and able to assert themselves within their peer group. The focus of the status phase is on the context in which the relationship is occurring.

The third phase is the affection phase. The focus in this phase is on the actual relationship, which is experienced as more involving, rewarding, and personal. The final stage is the bonding phase. The relationship is also central to this stage. As in the affection phase, feelings of involvement for the relationship dominate; however, other pragmatic concerns surface with regard to the degree to which the dating partner will remain a lifetime romantic partner. Identity concerns may resurface either as each partner's individual identity becomes merged with the other or as a couple identity is formed from which the individual identities are inseparable.

Other theories of the development of adolescent relationships include (a) considering attachment theory as it relates first from parent to child and then from child to romantic partner; (b) relating the increased intimacy in adolescent dating relationships to changes in the adolescent's relationship to parents, as occurring in the current context of prolonged dependency and delayed transition to adulthood; and (c) integrating developmental changes in peer relationships with those occurring in dating relationships in a developmental sequence.

PARENTAL AND CULTURAL PROHIBITIONS ACROSS TIME

A number of parent factors are related to adolescents' timing and experiencing of dating. For example, parents who raise their children with traditional sex role orientations are more likely to have sons who have a sexual orientation toward dating and daughters who have a romantic or affectional orientation toward dating. Mothers with higher educational attainment are less likely to have daughters who are sexually active in their early dating relationships; these daughters are also more likely to marry at an older age. Parental religious involvement may also impact adolescent dating behavior because individuals who are active in their church communities tend to be more sexually conservative in their dating. Adolescents raised in one-parent families are more likely to start dating at an early age and have a higher divorce rate when their dating relationships turn into marriage. Similarly, studies of adolescents who have formed close online relationships indicate that these youth are more likely to come from families characterized by high levels of conflict (adolescent girls) or low levels of communication (adolescent boys). Conversely, closeness in the parent-child relationship and in the parent-parent relationship is a predictor of romantic intimacy capacity for adolescents and young adults.

Parents (and peers) also engage in behaviors that can serve either to promote or deter the progression of particular dating relationships. Parental behaviors that signal relationship approval include relaying phone messages and communications from the dating partner, asking about the partner, being welcoming and pleasant to the partner, including the partner in family activities and events, and letting their child and the partner have time alone together. In contrast, disapproving behaviors include talking about other people that their child could date, making disparaging remarks about the dating partner, cautioning the offspring about their involvement in the dating relationship, and telling their child that it is better to wait before getting too serious in this dating relationship.

INTERRACIAL AND INTERCULTURAL DATING

Although interracial and intercultural romantic relationships have been present throughout history, they

have rarely been culturally encouraged or even accepted. In fact, these relationships have often been prohibited. For example, in 1966, 17 of the 50 United States legally banned interracial relationships that transpired between individuals of White decent and "persons with one-eighth or more of Negro blood or those related within three generations to a member of a particular racial group" (as cited in Martin et al., 2003, p. 54).

On June 12, 1967, in the case *Loving v. Virginia*, the Supreme Court ruled these prohibitions illegal. However, it took 33 more years for all 50 states to concur. It was not until the year 2000 that Alabama finally modified its law against interracial marriages. Ultimately, however, an increase in racial and/or ethnic diversity within the United States should cause a corresponding increase in interracial and intercultural dating and marriage, eventually promoting greater acceptance of these relationships.

Researchers have studied why people choose to become involved in interracial romantic relationships, given their likelihood of social disapproval. According to research, demographics such as socioeconomic status, education, occupation, and residence influence the initiation, development, and maintenance of interracial dating relationships and marriages. The political and social contexts in which interracial and intercultural relations transpire also appear to influence whether friendships and/or romantic relationships develop between individuals of different races. Empirical research shows that individuals (a) who live in diverse neighborhoods, (b) who have interracially diverse friendships, and (c) who have family members who date people of other races and cultures are most likely to date interracially and interculturally. These findings have led to the general contact hypothesis, which states that "when people come into contact with others who are different from them under favorable conditions (neighborhood playgrounds, integrated classrooms, intercultural friends of the family), negative attitudes decrease, positive attitudes increase, and intercultural friendships and romantic relationships are likely to develop" (Martin et al., 2003, p. 67).

SEXUALITY AND DATING

Much of the research on dating relationships has considered the degree to which these relationships include particular sexual behaviors. For example, several recent surveys of never-married men between the ages of 20 and 39 revealed that more than 85% of the men were nonvirgins. When asked about their sexual behavior within the preceding year and a half, most of these single men had had a single coital partner; however, about 20% of the men had had four or more sexual partners during this time period.

Similar studies of single women between the ages of 20 and 29 indicated that about 80% of these women were nonvirgins. Again, the majority of these women had had only one sexual partner during the preceding 18 months, and less than 10% of these young single women reported having had five or more coital partners during this time period.

Dating and the initiation of sexual behavior seem to be sequentially related. By age 14, about 50% of girls have started dating. Three years later, about 50% of girls have had sexual intercourse. Thus, there typically appears to be a few years' delay between first date and first experience of sexual intercourse.

Studies conducted in the late 1960s through the early 1980s demonstrated a growing permissiveness toward sexual behavior and attitudes within American culture. However, more recent research suggests that these permissive attitudes have been waning, perhaps because of the public concern regarding the spread of acquired immunodeficiency syndrome (AIDS) and other sexually transmitted diseases. Acceptance of sexual intimacy as part of dating relationships has also been shown to vary by culture. For example, North American men have been shown to be more accepting of premarital sex than Japanese men, for both men and women, whereas Russian men were more likely to endorse the traditional double standard, which grants more sexual freedom to men than women.

Greater acceptance of premarital sex has been shown to associate with an absence or reduction of religiosity, as well as with being young, politically liberal, Black, male, and single. A strong commitment to one's dating partner also predicts greater support for engaging in premarital coitus. Four primary factors have been shown to influence one's decision to engage in sexual intercourse with a dating partner for the first time: quality of relationship, sexual arousal, pressure, and circumstances related to the use of drugs and/or alcohol. Dating partners are also motivated to participate in sexually intimate acts in order to feel nurturing toward or show emotional commitment to their partner and/or to experience pleasure. Conversely, empirical research has found that men and women refrain from participating in initiated sexual activity for reasons including concern regarding pregnancy, sexually transmitted diseases, and AIDS; moral reasons; concern that their partner would view sex as commitment; and/or not liking their partner enough.

DATING RELATIONSHIPS AT RISK FOR VIOLENCE OR RAPE

Thus, while dating relationships are clearly developmentally important, they are not risk free. Current research indicates that dating relationships can also include psychological, physical, and sexual violence. In fact, these events may be even more likely in dating relationships than in marital relationships. Efforts to predict which relationships are at risk or which dating partners are dangerous are ongoing. Data indicate that physical violence has occurred in approximately one third of all dating relationships, according to at least one partner's report. Male perpetrators are more likely to have low socioeconomic status, be undereducated, come from a family characterized by violence or in which sexual victimization occurred, have high levels of anger and hostility, have problems with depression, and be experiencing problems with alcohol and/or drugs. The rates of psychological abuse occurring in dating relationships are even higher than those for physical abuse. Perpetration of psychological abuse may be even harder to predict because it is ubiquitous.

Date rape is also a potential risk in relationships. This type of rape has been associated with family alienation, dating significantly older men, drug and alcohol use on the date, miscommunication about whether the woman was interested in sex, whether the man initiated the date and drove her to the date in his vehicle, and the degree to which he spent a lot of money on the women. Victim characteristics include earlier age of menarche, prior sexual activity, younger age at first intercourse, dating less familiar men, more sexually active with same-sex friends, poor peer relationships, and poorer emotional health. Perpetrator characteristics include attitudes condoning rape and violence against women, traditional sex role beliefs, personal irresponsibility, and lack of social conscience.

—Jennifer Langhinrichsen-Rohling, Hester Dooley, and Ruth Langhinrichs

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DEADBEAT DADS

As the population of the United States shifted from rural, agrarian, or farming living arrangements to those of more urban and industrial conditions starting in the middle of the 19th century, men saw their role as parent transformed by employment demands that pulled them away from the home. Instead of holding a central role as instructor and instiller of core knowledge such as social norms and spiritual beliefs—tasks allowing great contact with one's children—a father's role has become more synonymous with the more distant role of absent provider for the family. Despite holding significant income advantages over mothers, fathers have lost much of the power to interact with—and therefore influence—their children on a daily basis.

Current American families reflect a much larger diversity in makeup or constellation compared with families of the past, as a result of higher rates of divorce and separation. Approximately half of all first marriages end in divorce, with rates exceeding 67% for second and third marriages. Many expectant parents decide not to marry. Indeed, 31.2% of today's custodial mothers have never been married. According to 2002 U.S. Census data, approximately 13.4 million custodial parents had custody of 21.5 million dependents under age 21 years in 2002. Approximately five of six (84.4%) of these

custodial parents are mothers, a proportion that has appeared stable for approximately one decade.

In many ways, a troubling characteristic of the contemporary family overall is that fathers are more likely to be rather absent from their children's lives than in previous times. Although every father likely struggles to enhance his presence in his child's life, some fathers actively choose to minimize or terminate their support of their dependent offspring. Studies suggest that many of these decisions by fathers to terminate relationships with their children occur as a collateral effect of conflict or disengagement with their children's mother. A "deadbeat dad" can be defined as a form of child abandonment in which an absentee or nonresident father worsens his child's living conditions by withholding his financial support, physical contact, and psychological, intellectual, and cultural tutelage. Earlier investigations of deadbeat dads in the literature focused predominantly on the financial support provided by noncustodial fathers, while later studies have explored the other facets of such an absent father.

PREVALENCE

In the United States in 2002, approximately 7.1 million out of 11.3 million custodial mothers (63%) were court awarded child support, with awards averaging $5,138 annually. Even more startling is that the amounts of child support actually received in 2002 averaged only $3,192 annually—a mere 62% of the awards granted. Roughly 4.6 million mothers (74.7%) received some support, and less than half (2.8 million; 45.4%) received all of their awarded support. As evidence of the value of establishing and maintaining child support agreements, custodial parents who received all of the child support due to them in 2002 were less likely (14.6%) to have poverty-level annual income than were parents who received only some or none of their expected child support. Parental involvement of the father, as measured by father visitation, has been found to be positively associated with the provision of child support.

CONSEQUENCES

Despite the emphasis of financial responsibility within the discussion of deadbeat dads, children appear to need far more than money from their fathers to promote and facilitate successful adjustment and development. Children who share healthy relationships with their fathers display a reduced likelihood of parenting at an early age, abusing substances, or being declared a juvenile delinquent and have a greater probability of earning their high school diploma. Yet, this relationship is not explained merely by quantity of contact between father and child. A great body of literature suggests that a father's ability to be emotionally connected with his child, his provision of financial support, and his direct interaction with his child contribute to his child's cognitive competence, academic achievement, social competence, impulse control, and self-esteem. As a result of this foundation of developed characteristics, a child then is less likely to engage in delinquent behavior or to become involved with destructive peer groups.

APPROACHES TO THE PROBLEM

The initial approach to the complex problems created through the absence of deadbeat dads was that of child support enforcement. The federal government created the Child Support Enforcement Program in 1975 after a correlation was established between claims for public assistance or welfare by custodial parents and the nonpayment of child support by the affiliated noncustodial parent. When this program failed to increase payment rates adequately, custodial parents and their children continued to rely on federal and state financial assistance. In 1984, federal legislation ordered state and local governments to enforce access and visitation rights for noncustodial fathers in a manner that complemented efforts to gather child support payments. In 1996, the Federal Welfare Reform Act included a mandate for states to pursue child support from nonpaying parents when a custodial parent seeks state financial assistance. The program allowed for the seizing of wages of nonpaying fathers. Individual states have developed creative ways to track the employment of fathers and to garner their future salaries for appropriate child support payments. Even deception has been used as a tool to arrest non-paying fathers who successfully avoid or disregard other legal attempts to recoup unpaid support. Examples of deception uses include contacting fathers about false winnings of a sweepstakes or sporting event tickets, then arresting them when they show to collect their "rewards."

Issues related to the collection of child support from deadbeat dads are the employability and job retention of those fathers. Recent studies find that fathers are often connected with their children at birth and report a desire to support and father their children. However, many fathers who fall into the "deadbeat"

category are "dead broke" young men with low literacy rates and poor work histories. Reviews focusing on teenage fathers report child support collection rates of only 13% nationally, significantly lower than overall rates. Low average wages amplify the limited ability of young fathers to financially support children. Successful child support enforcement or enhancement interventions, based on informative exploratory efforts such as the Parents' Fair Share (1988–1996) and the Young Unwed Fathers Project (1992–1994), focus beyond mere child support payment collection and help fathers to develop basic employment skills, including job search techniques, résumé writing, communication skills, and vocational training.

Other intervention methods have focused on improving men's ability to nurturantly provide for their children's psychological needs. Peer support groups and psychoeducation sessions allow for the attainment of basic parenting skills, such as relationship building, child development concepts, anger management, and life skills training. Often it is helpful to include discussions about cooperative parenting to enable fathers to better interact with their child's mother to allow the child an opportunity to experience both parents in a less combative environment. On a larger scale, media campaigns and public education efforts, such as those provided through the Fatherhood Project and the National Center for Fathering, have attempted to provide a broader redefinition of fatherhood that allows for greater nurturance and involvement with children.

As a preventive approach, many interventions that focus on reducing teenage pregnancies are broadening in scope from the emphasis on young women to focus on young men and include discussions of fathers' financial and other obligations. Based on early projects such as the Teen Fathers Collaboration (1983–1985), these programs attempt to reduce underage parenting by moving from issues related to sexual behavior and contraception to the range of responsibilities carried by parents, especially young men. This enhanced message, whether received via such preventive efforts or by other means, appears to be making a difference among adolescents. Among male teenagers, approximately 50% reported no sexual intercourse in 2001, compared with 39% in 1990. Teenage pregnancies have decreased from 116.9 out of every 1,000 girls in 1990 to 83.6 per 1000 girls in 2000, with such a trend consistent across race and ethnicity groups in the United States. Although many factors may contribute to these notable trends, discussions regarding parental responsibilities may continue to provide teenagers with the rationale necessary to make adaptive early decisions regarding sexual activity.

The promotion of healthy marriages is another avenue of prevention that has been applied to the topic of deadbeat dads. In an era of "no-fault" divorce, higher rates of dissolved marriages result in higher requests for government subsidies that typically fail to fully support a family. Many of these marriage-focused projects are church based and assume that responsible fathering is more likely to occur within the context of a marriage. Specific programs, including premarital counseling, prebirth parenting classes, and conflict resolution psychoeducation classes, appear to help decrease the likelihood of divorce among high-risk couples, and do result in higher annual incomes for families with children. Key factors affecting child outcomes include the qualities of the father-mother and father-child relationships within such sustained marriages. For men who have distanced from the mothers of their children, it may be more difficult to overcome unresolved issues between unwed fathers and mothers. The Institute for Responsible Fatherhood and Family Revitalization and similar projects assert that once a man's heart is turned toward his children and their mother, even a successful marriage is possible.

SUMMARY

The birth of one's child is an event that every father should be allowed to celebrate. Helping more men to see the wisdom in waiting to parent until they are economically and emotionally ready adults, to view their potential influence of their children via fathering as irreplaceable, and to see themselves as equal partners with their children's mothers in the rearing and support of their offspring will make the development of deadbeat dads less likely events.

—Gabriel J. Ybarra and Lori J. Lange

See also Divorce

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DEAFNESS

The word *deafness* encompasses the state of not hearing. Prevalence estimates indicate that roughly 34 million adults representing approximately 17% of the United States report having a hearing loss. Within this group, the number of adults with severe to profound hearing loss ranges from 464,000 to 738,000, with approximately 54% being older than 65 years of age. Roughly 83 out of every 1,000 children have hearing loss.

DIAGNOSIS OF DEAFNESS

Deafness can be diagnosed very shortly after birth based on hearing screening in hospitals. Hearing loss can also occur suddenly, at any age, for a variety of medical reasons. Additionally, hearing loss can be progressive. In that situation, diagnosing deafness may take longer, depending on age. One factor that reinforces the delay in diagnosis is related to the difficulty in recognizing that a hearing loss may be present. For example, caregivers of toddlers may interpret the child's behavior as stubborn without realizing the child may not hear. If caregivers express their concern about the delay in spoken language, doctors may tell them to be patient instead of referring them for an audiological (hearing) evaluation. Currently, diagnosis of deafness tends to happen between 12 and 33 months of age. With universal newborn hearing screening now mandated in most states, the use of electrophysiological methods that have been developed to screen infants for hearing loss is likely to significantly lower the age at which deafness is diagnosed.

Hearing loss levels are categorized as mild, moderate, severe, and profound. Severe and profound deafness means that the available hearing level is insufficient to permit the understanding of speech through the ear alone, with or without hearing aids. Hard-of-hearing persons tend to have mild or moderate hearing losses that make it difficult but not impossible to understand speech, with or without hearing aids. The audiological evaluation takes loudness and pitch into account in diagnosing hearing loss. Loudness is measured in decibels (dB) across a range of frequencies that goes from low to high. Pitch is the subjective term for frequency. Examples of low pitch include men's voices and vowels. Women's voices and consonants are examples of high pitch. Audiologists often use the average of the responses obtained at three frequencies across the speech range to determine the level of hearing loss.

EARLY INTERVENTION PROGRAMS

After diagnosis, early intervention programs facilitate the family's ability to appropriately nurture and communicate with their deaf child from infancy onward. Families get basic information about deafness, auditory amplification devices, language development issues, communication approaches, techniques for providing stimulating and accessible environments, and educational options. Quality intervention programs are family centered in that they are sensitive to family variables and involve parent-child sessions during which caregivers have the opportunity to practice interaction strategies that will enhance the child's communication and social development.

Recent research confirms the effectiveness of early enrollment in family intervention programs after early identification of hearing loss in optimizing the deaf child's ability to communicate and meet developmentally appropriate social and educational milestones. Building on these findings, research is currently focusing on evaluation of the service delivery process by means of examining the interface of program components, the needs of the individual child, family variables including culture and parenting style, and service provider characteristics.

LANGUAGE AND COMMUNICATION

Parents have to make decisions about language and communication issues. Language and communication are often incorrectly viewed as interchangeable. Language refers to conventionalized signs or sounds having understood meanings together with rules for manipulating expressions. In the case of deafness, language refers to spoken, read, or signed language (e.g., English, Spanish, American Sign Language [ASL], etc.). Communication refers to the process by which information is exchanged through a common system, whether spoken or signed. Deaf children can be exposed to spoken English, the spoken language of their home if different from English, signed English (signs matching English word order), cued speech (with handshapes on the face indicating the speech sounds of the language), and/or ASL. There has been a long history of conflict between supporters of spoken language for deaf persons and those who endorse the use of signed languages to facilitate optimal psychosocial development. Research with young children and their families indicates that the critical variable is not the communication modality but rather active family involvement. When service providers and families collaborate effectively in adjusting to the language and communication needs of the deaf child, this increases the chances of effective parent-child communication and in turn of achieving expected developmental milestones with minimal delay. It is important to recognize that deaf children rely most often on visual avenues for communication and language learning. Auditory training is essential if the focus is on spoken language and entails intensive time commitment. Family intervention programs as well as schools may emphasize spoken language, signed English, or ASL as a bridge to written English through bilingual approaches.

AUDITORY AMPLIFICATION

Parents also have to make decisions about auditory amplification, most notably between hearing aids and cochlear implants, if they want to encourage spoken language development in their deaf child. Digital hearing aids provide sound-processing strategies that can be programmed to fit the individual user. Cochlear implants require surgery to insert an electrode array within the inner ear structures, the purpose being to provide access to sound. For young deaf children, the process for learning to listen with any device tends to be lengthy because current technology does not match the cues offered by the optimally functioning ear. Current research on children with cochlear implants suggests increased potential for improvement in speech comprehension, although results are variable. However, emerging new technology continues to render earlier results obsolete, therefore requiring new research on the effectiveness of cochlear implants in facilitating the development of spoken language. In the case of individuals who become deaf after acquiring spoken language, research indicates that cochlear implants appear to be effective in facilitating speech comprehension.

EDUCATING DEAF CHILDREN

Deaf children are educated in a variety of settings. Approximately 20% are in specialized schools for the deaf, with the rest (80%) in mainstreamed programs. Some of these children are in self-contained classes with deaf children only, some are fully mainstreamed with hearing peers, and others are partially mainstreamed and partially in a self-contained class. Placement decisions depend most often on what is available in the family's geographic location. Almost all of the children in mainstream education require support services such as assistive listening devices, sign language or oral interpreters, communication access real-time transcription (CART) using computers, and tutoring. Deaf persons graduating from both specialized and mainstream settings on average do not achieve educational parity with their hearing peers. Their nonverbal intellectual functioning is similar to that of their normal hearing group, but limited exposure to linguistic and environmental stimuli in addition to the possible presence of additional disabilities depending on etiology make it difficult to catch up educationally. However, many deaf students have gone on to higher education and are successful in achieving career goals, primarily because involved families provided necessary support in addition to what the schools provided.

SOCIALIZATION ASPECTS

Research indicates that in the area of socialization, deaf children tend to socialize with deaf peers more often than they do with hearing peers, even in mainstream settings. The limited signing ability of hearing

peers and the variable speech intelligibility of deaf peers makes socialization between the two groups more difficult. School social skills intervention programs with proven effectiveness have the potential to increase interaction when implemented consistently.

PERSPECTIVES ON DEAFNESS

To further understand deafness, it is necessary to note the presence of two basic perspectives of deafness. One is that of disability. The other perspective is sociolinguistic in nature and emphasizes deafness as part of the diversity spectrum.

The disability perspective is the one most individuals are familiar with. It focuses on deafness as a disability based on the biological function of the ear and the medical etiologies of hearing loss. Medical doctors are the ones who typically make initial recommendations when deafness is diagnosed, followed by audiologists. If medicine or surgery cannot eliminate the hearing loss, audiologists then recommend appropriate technology, including hearing aids, cochlear implants, and assistive listening devices, in order to enhance hearing ability. The goal is to overcome the isolating conditions of deafness by enabling the child or adult to hear and use spoken communication within the hearing family, school, and work environments.

The sociolinguistic perspective conceptualizes deafness as representing a linguistic and cultural minority. Specifically, the focus is not on the medical and disabling causes of deafness and auditory rehabilitation. Rather, the focus is on the use of ASL as a language that takes advantage of the deaf person's natural reliance on vision to communicate with other people. The use of ASL is seen as connecting individuals with the culture of deaf people and thereby mitigating their isolation within hearing communities. Deafness becomes a bond that brings deaf people together.

In conclusion, deafness is far more than just not hearing. There are complex ramifications that affect the lives of people who are deaf.

—Irene W. Leigh

See also American Sign Language (ASL), Cochlear Implant

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DEATH

The subjects of "children" and "death" seem somehow contradictory and yet it is clear, based on children's drawings and writings, as well as a child's adulthood memories, that the two subjects are often related. Consider the history of certain chants and games:

1. "Peekaboo" is said to be derived from an old English word meaning "dead" and "alive."
2. The children's rhyme, "Ring around a rosie, a pocket full of posies; Ashes, ashes, we all fall down," began in the 1300s with children's awareness of the symptoms of the Black Plague that killed over 25 million people.
3. An old English children's prayer, "Now I lay me down to sleep, I pray the Lord my soul to keep; if I should die before I wake, I pray the Lord my soul to take."
4. The history of the children's games of "hide and seek" and even "tag" are thought to be related historically to children's concerns with life and death.

Nevertheless, since the 1980s in the United States, we are experiencing the world's first death-free

generation, meaning that a child is likely to grow to adulthood and never experience a death in their immediate family. (Death is experienced once in approximately 20 years for primary family members.) Yet 60% of children younger than 18 years of age will live in a single-parent home, for many an emotional equivalent of death. (Twenty percent of teens now live in single-parent homes.)

DEVELOPMENTAL ASPECTS OF DEATH

Just as children's understanding of their environment and their place in this environment change with time, so does their understanding of the concept of death. A child's understanding of death is often described in four developmental stages:

1. Birth to 3 years of age
2. Three to 6 years of age
3. Five or 6 to 9 or 10 years of age
4. Ten plus years of age

From birth to 3 years, a child has no cognitive awareness or mental image of death, yet a physical response to death does exist. Rene Spitz' classic work in the 1940s set the stage for the understanding of a very young child's awareness of death of a significant caretaker. Spitz observed children placed in institutional settings as a result of the death of a parent or parents and from this work coined the term *anaclitic depression*. The symptoms of anaclitic depression are weight loss, increased demandingness and weepiness, and the arrest of developmental progress, with some children by the 3rd month refusing contact with people and assuming a prone position in the crib with an averted face. This term described the physical characteristics listed above. Thirty-seven percent of these children studied by Spitz died from malnutrition and infection at the end of 2 years.

The sources of studies of children and death between the ages of 3 and 10 years usually rely on the observation of children's drawings and stories as told to various child development researchers. Two classic studies are those of Maria Nagy (1948) and Sylvia Anthony (1971). From 3 to 6 years of age, children see death as temporary and reversible. A child's understanding is that death is like taking a trip or sleeping. During this period, children think concretely, and destroying and reviving persons is commonplace in children's play. A young boy of 4, several weeks after the burial of the family dog, suggested that the family go and retrieve "Peter" from the cemetery. His belief was that Peter was living in the cemetery and only required being "dug up," a reversal of the burying process that he had witnessed, to bring the pet back to life.

Another common thread in the belief set of 3- to 6-year-olds is the sense that death is not only temporary and reversible but also "living under changed circumstances."

One of Maria Nagy's interviews of a 6-year-old Hungarian boy is as follows:

"He stretched out his arms and lay down. He can't speak. Can't move or see. He lies for four days."

(Nagy) "Why for four days?"

"Because the angels don't know yet where he is. The angels dig him out and take him with them."

(Nagy) "What happens to him?"

"If it's a woman, she does the cleaning. If it's a man, then he'll be an angel. He brings Christmas trees."

(Nagy) "Well, what are you going to do when you get there?"

"I'm going to bake cakes the whole year. Each angel has his own stove."

This is wonderfully illustrative of the belief of the young child that death brings life under changed circumstances, and this particular 6-year-old believes he will be baking and delivering Christmas trees after his own death.

The next stage—5 or 6 until 9 or 10 years of age—is characterized by a more sophisticated but still concrete view of death. Hungarian children in Maria Nagy's study personified death, making death into a person or being that would capture or take little children. These children, from a different cultural background, discussed death as equivalent to the presence of skeletons, ghosts, or the boogieman. They often described death as coming with a scythe. Children in the United States, even though equally fascinated by death as their Hungarian peers, describe their beliefs in different ways. Children in the United States are particularly fascinated with the subject of death and seem to be riveted by discussions, pictures, and the rituals of death and dying. Halloween is often the favorite holiday for children in this age group. Boys in this age group most often draw pictures of blood

and gore and emphasize the violence of death in their drawings and stories. Girls, on the other hand, emphasize the "romance" of death and put tombstones, flowers, angels, and other heavenly beings in their drawings.

Ten years and older marks the beginning of a more adult understanding of death. This is the first time that children begin to comprehend that death is final. It is around this age that children begin to comprehend abstractions and grasp the concepts of the universality, irreversibility, and nonfunctionality of death:

1. *Universality*: the knowledge that every living thing eventually dies
2. *Irreversibility*: the knowledge that once dead, living things do not return to life
3. *Nonfunctionality*: the knowledge that death means the cessation of all bodily functions

EXPRESSIONS OF GRIEF

Children differ from adults in their expressions of the grieving process. Some of the more common expressions are as follows:

1. *Shock, denial, lack of feelings*: Children tend to grieve in "bits and spurts" rather than in a continuous fashion as do most adults; therefore, it is less obvious, when children are playing and seemingly not sad, that they are experiencing a grieving process.

2. *Physical changes*: Children are likely to express grief in physical rather than verbal ways. Children have little permission or opportunity to talk about death and are less capable of putting words to their feelings, and so they often express their sadness or loss by being tired, showing lack of energy, having difficulty with sleep or appetite, having headaches or stomach aches, and/or experiencing skin rashes or hair loss.

3. *Regression*: After the death of a caretaker, a child may become overly dependent on the remaining parent, often having an inability to separate from the still living parent.

4. *"Big man" or "big woman" syndromes*: Children experiencing a significant loss may take on the role of the missing adult, seemingly becoming more mature than their peers.

5. *Disorganization, panic, fear*: A child's life after a significant death feels chaotic and out of control. Many children express fear that their other caretakers may die as well.

6. *Explosive, "acting out" behavior*: Some children become increasingly angry at themselves or others, behaving uncharacteristically in an angry, out-of-control fashion.

7. *Loss, emptiness*: A child may become dependent on someone outside the family, avoiding the reminders in their home of the family loss.

8. *Relief*: Particularly after a long illness, a child will express relief that the difficult period has ended. This behavior is similarly felt among adults, but expressed more privately, in that this response is seen in society as an inappropriate one.

9. *Gender differences*: Girls and boys are socialized to express grief differently. Girls are likely to be reinforced for sharing grief openly; boys are expected to be strong and express their grief privately.

SUMMARY

Death is a part of a child's life. From birth onward, an understanding of death is expressed by children commensurate with their developmental age and gender. Children have characteristic ways of responding to death that differ from a typical adult response.

—Mary Ann Watson

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DEATH WITH DIGNITY

"Death with dignity" has long been a slogan of the "right to die" movement. Proponents of legalizing physician-assisted suicide and/or voluntary active euthanasia (in which mentally competent patients with terminal illnesses can request to end their lives and suffering) adopted this rallying cry as a means of speaking to the concern of the general public about the dehumanizing aspects of dying in increasingly technologically sophisticated health care settings. In contrast, opposition to "mercy killing" has arisen in some religious and ethnic communities who oppose the medical termination of life under any condition, either for moral reasons or because of historically conditioned distrust toward the health care system. Recently, proponents of palliative care as an alternative to assisted suicide and euthanasia have attempted to demonstrate that dignified deaths are possible when the dying person's needs are attended to in sincere and caring ways. Thus, the concept of a "dignified death" is subject to varying interpretations, ranging from endorsement of the patient's right to request physician assistance in dying, to the less ethically contested principles that a person can refuse futile treatment that only prolongs suffering and that systematic attention to pain management along with the patient's (and family's) psychological, social, and spiritual needs is essential to permit an appropriate death.

Interest in assisted suicide and euthanasia in the United States dates back to the early 20th century, with the first euthanasia bill drafted in Ohio in 1906 and the first euthanasia society in the United States being founded in New York in 1938. However, it was not until the 1970s that the movement gained significant traction, possibly as a result of the development and use of medical technology that could prolong life and, perhaps secondarily, increase perceived suffering. Although there had been widespread efforts to distribute "living wills" to permit patients to declare their end-of-life treatment preferences, the first state statute legalizing the use of living wills was not passed until 1976 in California, coinciding with the New Jersey Supreme Court's decision to allow the parents of Karen Ann Quinlan to disconnect the ventilator that was keeping her alive in an unconscious vegetative state.

The Hemlock Society (recently renamed "End-of-Life Choices") was founded in 1980 with a charter principle to publish a book "about methods and strategies of planned death with dignity." *Final Exit*, which provided explicit information, appeared in 1991, written by society founder Derek Humphry. "Death with dignity" was widely adopted as a catchphrase for the movement to indicate the desire to die in a way that did not sacrifice quality of life for quantity. Many subsequent legislative efforts were referred to as "death with dignity" acts or bills, such as an unsuccessful bill in Oregon in 1991, an unsuccessful act on the 1992 California ballot, and the successful 1994 Oregon Death with Dignity Act (which was passed again and implemented in late 1997).

This idea of "death with dignity" tapped into a core concern of the general public, because the possibility of losing one's dignity near the end of life is one of the greatest fears of people in general and dying individuals in particular. Perhaps for this reason, numerous surveys of public and professional attitudes concerning end-of-life treatment decisions indicate widespread, but not universal, support for the principle of patient self-determination as a means of ensuring death without unnecessary suffering, at least in many Western countries. Partly as a result of this growing awareness of the problem, more attention is being given to the idea that a person can die with her or his dignity intact without having to resort to assisted suicide or euthanasia. Although this has been a core aspect of hospice care, it is likely that a diversity of efforts to enhance dignity near the end of life will be undertaken in medical settings and other long-term care institutions in the future.

—James L. Werth, Jr., and Robert A. Neimeyer

See also Death, Funerals, Palliative Care

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DEDUCTIVE REASONING

The study of reasoning is very important because it pertains to the heart of the question of whether people think logically and rationally. Do people follow the basic rules of logic when they make inferences? Some researchers highlight the flaws of human reasoning and its irrationality; others stress the enormous flexibility and rationality of human reasoning.

Reasoning can be distinguished in inductive reasoning and deductive reasoning. Inductive reasoning refers to moving from the specific to the general, for example, "You can find the whole of nature within one flower." Studying the details of a flower can lead to general hypotheses and rules about nature. This is an inductive approach. On the other hand, deductive reasoning means taking a general rule or theory and making inferences about a specific example.

Deductive reasoning has been widely studied using propositions in the form of "If . . . then" statements and using deductive arguments, also called syllogisms. Let us take the following example for a proposition: "If A, and B, but not C at the same time of E, then F in order to avoid G." This example is quite abstract. An example of this proposition is, "If you have a car (A) which runs on diesel (B), but not a car which runs on regular gasoline (C), when you want to start the car (E), then you have to wait a bit and let it glow before you start (F), otherwise you damage the motor (G)."

An example for a syllogism is the following: "All cats love sausages. Fluffy is a cat. Therefore, Fluffy loves sausages." The syllogism consists of two arguments, also called premises, and one conclusion. According to rules of logic, if the premises are true, the conclusion is also true. In our example, the two premises are true; therefore, the conclusion is also true. The presented syllogism only consists of two premises. Syllogisms become difficult, however, when they consist of many premises, when they include the quantifier "some" instead of "all," or when one premise is negated.

Several theoretical approaches have been developed that try to explain how people deal with syllogisms, that is, what cognitive processes occur when people solve syllogisms. A first approach, according to Sternberg, for example, distinguishes several components: encoding the information presented, mentally representing the meaning of the words in the premises, and controlling one's own mental processes. A second approach, following Braine, for example, stresses the mental rules or inferences people use to draw conclusions. People might not be aware of these rules. These rules are often implicit like the rules of grammar we use to build sentences. A third approach, developed by Johnson-Laird, understands deductive reasoning as the building of mental models. Similar to understanding language by constructing mental models, people construct mental models when they read premises and draw conclusions. Recent neuropsychological studies of Goel and colleagues find initial support for the mental models approach. However, one might see these approaches not as mutually exclusive or contradictory, but as complementing one another.

In the context of cognitive development, the ability of deductive reasoning starts with the concrete operational stage (labeled by Jean Piaget) at around the age of 6 or 7 years. One prerequisite for deductive reasoning is the ability of the child to build groups and hierarchies of groups on different levels of abstraction, for example, the ability to know and differentiate dogs from cats and birds, and in greater complexity, differentiating German shepherds from poodles and bulldogs. This ability allows children to categorize objects correctly using necessary and sufficient criteria. Children at the preoperational stage of cognitive development, however, classify objects if they merely look similar (e.g., for them a carp and a whale are both fish). Although children in the preoperational stage can classify objects, children in the concrete operational stage are able to do this with more complexity and sophistication.

In the earlier years of childhood, some mistakes of deductive reasoning can be evident and observed. Many children, for example, overgeneralize and label every animal they see as "dog." The implicit argument might be the following: "All objects that move, that have two eyes, two ears, a nose, and four legs are dogs. This concrete object that moves in the park has two eyes, two ears, a nose, and four legs. Therefore, it is a dog." However, the object might not be a dog, but a sheep or a cat. In most cases, when the child then says "dog" and it is not a dog, other persons present

might correct the child and help the child to differentiate and further refine his or her schemata.

Another error in deductive reasoning is undergeneralization. A child might call only one specific brand of cereal, Cheerios, for instance, as "cereal" and not apply the category "cereal" to all other brands. The implicit argument might be the following: "This food which is round, small, and has a whole in the middle is cereal. This food is flat. Therefore, it is not cereal." It is common knowledge to most adults that Cheerios and corn flakes are both cereal. However, the child only labels the Cheerios as cereal. In both examples regarding overgeneralization and undergeneralization, the mistake lies in the first premise, that is, that all objects that have two eyes, two ears, a nose, four legs, and move are dogs; and that only Cheerios are cereal. The child is not yet able to distinguish appropriately between groups and is not able to differentiate between levels of abstraction.

One way to help children improve their deductive reasoning is visualization, for example, using Venn-diagrams. Venn-diagrams are geometric figures (e.g., circles or rectangles) that show similarities by overlapping figures. When drawing a Venn diagram about dogs and German shepherds, it becomes visually quite obvious that the group of dogs is bigger and more encompassing than the group of German shepherds and that the group of German shepherds is all included and a part of the group of dogs.

The ability of deductive and inductive reasoning acquired during the concrete operational stage is further developed during the stage of formal operational thinking. The abstract quality of formal operational thinking helps adolescents step back from the concrete content and judge the validity of the inferences. Let us consider the following syllogism: "All scorpions are mammals. Mammals are warm blooded. Therefore, scorpions are warm blooded." One might say this conclusion is true; another one might say this conclusion is not true. And both answers are right! The conclusion is logically correct and valid just following the abstract rules of logic and temporarily assuming the truth of the premises. However, the content of the first premise is untrue. In reality, scorpions are not mammals. Therefore, considering world knowledge about scorpions and mammals, people might think this is nonsense, and therefore might choose the answer "not true." Similarly, one might abstract from the content of the two previous examples on dogs and cereals and only judge the logical validity of the conclusions.

Premises conflicting with world knowledge are one difficulty in working with syllogisms. We already mentioned that syllogisms with negated premises or abstract formulated syllogisms are more difficult then syllogisms that are not negated and concrete. There are still other factors that influence the accuracy of solving syllogisms. Researchers such as Luria, Scribner, and Cole presented syllogisms to people from different educational backgrounds in different cultures in Africa, America, and Asia. In all cultures, participants who have a formal education, attend school, or have gone to school were able to solve syllogisms better than participants who did not go to school. Participants without formal school education gave correct answers in about 50% of the cases, which is not better than chance. This result does not necessarily mean that people who go to school think more rationally than those who do not go to school. They might just be more familiar with such kinds of problems. Looking not just at right or wrong answers, but at the kinds of answers and justifications of participants without formal school education, shows their way of thinking. In one study, Scribner presented the following syllogism: "All children like candy. Mary is a child. Does Mary like candy?" Someone without formal education might answer: "How would I know if Mary likes candy. I don't even know her!" or "Who is Mary?" These answers show that participants without formal school education interpret the syllogisms personally, using their world knowledge. They often refused to accept initial premises that contradicted their own experiences and they refused to treat general premises as truly general. It seems like they were not able or willing to stay within the problem boundaries. Interestingly, they could solve syllogisms easily that referred to familiar content.

To summarize, deductive reasoning is the ability to draw specific conclusions from general information. It is a key ability that children start acquiring in the concrete operational stage and that adolescents and adults further develop in the formal operational stage. Prerequisites for deductive reasoning are elaborated mental concepts on different levels of abstraction, as well as certain rules of inference. Research shows that in most cultures, formal schooling as well as familiarity with the material presented facilitate success on formal reasoning tasks.

—C. Dominik Güss

See also Cognitive Development, Inductive Reasoning

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DEFERRED IMITATION

Deferred imitation refers to observing a model and replicating important aspects of the model's behavior after some significant period. Jean Piaget proposed that deferred imitation, along with language, imagery, and symbolic play, is an indication of the symbolic (or semiotic) function. Although Piaget stated that deferred imitation emerges at around 18 months of age, more recent research has indicated deferred imitation for simple behaviors at as early as 6 or 9 months of age, although the complexity of the actions imitated increases with age.

The length of delay over which behaviors can be imitated also increases with age. For example, Andrew Meltzoff (1985) reported that 45% of 14-month-olds and 70% of 24-month-olds were able to defer imitation over 24 hours. Patricia Bauer and her colleagues (2000) assessed imitation over delays ranging from 1 to 12 months. They showed infants a series of three-step sequences; for instance, the model placed a bar across two posts, hung a plate from the bar, and then struck the plate with a mallet. About half of 9-month-olds tested showed imitation of simpler two-sequence actions after a 1-month delay, although these infants required at least three exposures to the events before displaying imitation. Rate of deferred imitation increased substantially for 13-, 16-, and 20-month-old infants, with older infants demonstrating higher levels of performance during each delay interval than younger infants did. In fact, by 20 months, children remembered individual actions for as long as 12 months.

Some have speculated that deferred imitation reflects a nonverbal form of explicit memory. Explicit, or declarative, memory refers to memory that is available to conscious awareness as reflected by tests of recall in verbal children and adults. This is contrasted with implicit, or nondeclarative, memory, which is memory without conscious awareness. Support for the position that deferred imitation reflects a type of explicit memory comes from research with adult amnesiacs. Adults with specific brain damage (usually to the hippocampus) are unable to form new explicit memories, although they are still able to form new implicit memories. For example, after practicing complicated motor tasks for several days, their performance improves substantially, although they have no conscious (i.e., explicit) recollection of ever having performed such tasks before. These brain-damaged patients perform similarly (and poorly) on explicit memory and deferred imitation tasks, suggesting that deferred imitation uses the same memory system as more conventional explicit memory tasks, implying that infants within their first year of life possess at least the rudiments of explicit cognition.

Evidence of deferred imitation as a nonverbal form of declarative memory may be especially important in comparative research with primates, investigating the possible phylogenetic origins of humans' unique cognitive abilities. Michael Tomasello (2000) has argued that true imitation requires that the observer not simply repeat the model's actions, but understand the model's goal, or intention. Evidence of deferred imitation of actions on objects has been observed in chimpanzees (*Pan troglodytes*), but only those that have been enculturated, or raised by humans, much as children are reared. Moreover, longitudinal research of deferred imitation in enculturated chimpanzees has shown that these abilities increase with age, with older chimpanzees being capable of more complex imitative behaviors, similar to the pattern observed for human infants. These findings suggest that chimpanzees, and possibly the common ancestor of both chimpanzees and humans, possess the rudimentary representational ability for explicit cognition.

Deferred imitation has been recognized as reflecting important cognitive abilities in children, beginning

with the work of Piaget. More recent research indicates that the representational skills underlying deferred imitation are found in infants much younger than proposed by Piaget and may be possessed, under certain circumstances, by humans' closest genetic relative, the chimpanzees.

—Courtney E. Green and David F. Bjorklund

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DELINQUENCY

DEFINITIONS AND DESCRIPTIONS

Delinquency is a legal term, which is generally defined as antisocial or criminal acts that violate legal laws and cultural norms. Juvenile delinquents are almost always diagnosed with oppositional defiant disorder (ODD) or conduct disorder (CD). According to the *Diagnostic and Statistical Manual of Mental Disorders,* 4th edition (*DSM-IV*), the standard manual used by psychologists and psychiatrists, ODD is characterized by a recurrent pattern of defiant, disobedient, and hostile behavior toward authority figures that persists for at least 6 months. These negative behaviors include arguing with adults and authority figures, frequently losing one's temper, actively disobeying the rules and requests of adults, continually blaming others for one's own mistakes or misconduct, being overly sensitive or becoming easily irritated by others, behaving in an angry or resentful manner, deliberately doing things that will annoy or anger others, or being actively spiteful or vindictive. Behavior exhibited by children diagnosed with CD involves violations of age-appropriate societal norms and the basic rights of others. These behaviors are often present in a variety of settings and can be placed into four main categories (i.e., threatening or aggressive behavior that causes physical harm to humans or animals, nonaggressive conduct that results in property damage or loss, deceitfulness and theft, and serious violations of rules and policies).

ONSET, PREVALENCE, AND COURSE

CD and ODD are the most frequently diagnosed disorders in adolescents and children. Indeed, these disorders account for almost half of all mental health referrals in children. ODD has been reported to occur in up to 16% of all youth, and CD has been estimated to occur in up to 10% of the adolescent population. While onset of ODD is usually gradual, the disorder is usually evident before the child reaches 8 years of age. CD can occur as early as the preschool years. However, a significant proportion of symptoms are usually first evidenced during middle childhood and middle adolescence. Approximately one third of children diagnosed with ODD will subsequently be diagnosed with CD. It should also be noted that if a youth continues to exhibit the social violating behaviors characteristic of CD after the age of 18, then the diagnosis of antisocial personality disorder (ASPD) will be made instead of CD. Without intervention, the severity of criminal acts and related behavioral problems are often exacerbated with the passage of time.

COMORBID DISORDERS AND CAUSES

There are many disorders that commonly occur in conjunction with delinquency, most often including attention deficit/hyperactivity disorder (ADHD), substance abuse disorders, and mood disorders, such as depression anxiety. Thus, it is not surprising that a child's risk for juvenile delinquency is often increased when a child's parent has been diagnosed with either

a substance misuse or abuse disorder, a mood disorder, schizophrenia, ADHD, antisocial personality disorder, or conduct disorder. Twin and adoption studies have indicated hereditary influences to delinquency, and parenting and familial risk factors have been shown to play an important role in the development and maintenance of conduct problems. For example, as compared with parents of nondelinquent youth, parents of children with conduct problems experience greater marital and interparental difficulties, stressful events, and chaotic environments. These parents are also more likely to make less positive and more negative statements, to perceive behavioral problems of their children as intentional, to have problem-solving deficits, and to abuse or neglect their children. Extrafamilial factors that have been associated with delinquency include low socioeconomic status, social isolation, and low parental social support. Children and youth with conduct problems often lack appropriate social skills, have poor peer relationships, and experience peer rejection more so than youth who do not evidence these problems.

EMPIRICALLY SUPPORTED INTERVENTIONS

Treatment programs for delinquent youth are usually multidimensional. When the symptoms of delinquency are determined to be primarily biological, psychopharmacological (drug) medications are sometimes prescribed, including psychostimulants and neuroleptic medications. Very few studies have evaluated the effectiveness of psychostimulants for conduct disorders, because these medications are typically combined for use with other interventions. However, studies have been conducted to examine the effectiveness of psychostimulants in the treatment of ADHD (a comorbid disorder that encompasses problems of inattention, hyperactivity, impulsiveness). These studies have reported significant reductions in problems of conduct, aggression, verbal harassment, noncompliance, stealing, and property destruction. Neuroleptic (i.e., antipsychotic) medications have shown reductions in aggression, fighting, explosiveness, and hostility, probably due to their sedative effects. However, these medications have not been widely supported for the treatment of conduct disorders due to adverse side effects associated with these drugs (e.g., sleep disturbance, dry mouth, irritability), and outcome support is mixed.

One treatment approach known as "parent training" assumes that deficits in parenting skills have been partly responsible for the development and/or maintenance of youth conduct problems. This treatment approach emphasizes prosocial goals and teaches parenting techniques, including training in positive reinforcement procedures, problem-solving techniques, role-playing practice, and structured homework exercises. Hanf and Forehand developed one of the first empirically supported parenting programs for younger youth (i.e., 3 to 8 years of age) who evidence ODD. The program focuses on child noncompliance and consists of two phases. In the first phase, the parent is taught to attend to the child's desired behavior and later praise the child for performance of compliant behaviors. In the second phase, the parent is taught to use time out for noncompliant behaviors through various behavioral methods, including didactic instruction, modeling, and role-playing. Time out involves the child being excluded from opportunities to be reinforced. Treatment also includes observation of the parent in parenting situations through one-way mirrors, as well as "bug in the ear" devices, which allow the therapist to communicate with the parent during the parent-child interactions. In this treatment program, the parent learns to increase the frequency of social attention, reduce the frequency of competing verbal behavior, and use verbal and physical attention contingent on compliance and other appropriate behaviors. Finally, the parent learns to actively employ the newly acquired skills in the home setting. This program has shown to be effective in improving child behaviors (e.g., aggression, temper tantrums, destructiveness, inappropriate verbal behaviors) and parent behaviors (positive communication, reduction of corporal punishment), as well as parents' perceptions of their children. Webster-Stratton and colleagues have developed an innovative parent training program that involves the use of videotapes. In this program (BASIC), a group of parents is shown videotapes that include examples of appropriate and inappropriate parent-child interactions. After each video clip, a therapist leads a group discussion in which the parents can discuss the video interactions that were modeled. Facilitators are also available to answer questions and provide guidance. The program has demonstrated clear support in controlled outcome studies with younger youth who evidence ODD. For instance, increases have been found in both mothers' and children's conduct, as well as in maternal satisfaction and perceptions of their children. Additional videotape components (i.e., ADVANCE, KIDVID) in

conjunction with the BASIC program have also resulted in improvements in child problem solving, conflict management skills, communication skills, and consumer satisfaction.

Family functional therapy (FFT) is a family-based intervention program that was designed to work with adolescent delinquents with both minor and major juvenile offenses. FFT concentrates on family members' expectations during treatment and serves to modify any inappropriate attributions or expectations. Various behavioral techniques are used, including role playing, communication skills training, and contingency management. Finally, the program serves to maintain therapeutic goals while also stressing the importance of the family's independence from the therapy context. FFT has shown improvements in communication variables and lower recidivism rates.

Multisystemic therapy (MST) focuses on multiple systems within an adolescent's world, including the role of family, school, and peer groups. Thus, the program incorporates school consultation, peer interventions, marital therapy, and individual therapy. The theoretical underpinnings of this program are family systems therapy and cognitive-behavioral therapy (e.g., joining family together, functional analysis, drug refusal skills training, stimulus control, and harm reduction). Recently, MST has incorporated a sophisticated contingency contracting procedure. The MST treatment approach has resulted in decreases in conduct problems, incarceration and arrest rates, peer aggression rates, substance-related arrests, and improved family relations. Unique to most programs, counselors usually visit youth in their home or school environment.

Problem-solving skills training (PSST) teaches youth with conduct problems how to solve problems in various situations and settings. Most PSST-based programs focus on teaching youth to learn four basic steps when confronted by a dilemma (i.e., state the problem clearly and succinctly, brainstorm options available and think of the advantages and disadvantages of each option, choose one or more options, implement one or more of the options). PSST has been shown to have positive effects in extremely aggressive children as well as in children with moderate to mild behavioral problems. Additionally, PSST has proven to be extremely effective when combined with parent training treatment programs.

Only one treatment outcome study has been conducted with youth formally diagnosed with both a conduct disorder and a substance abuse disorder (i.e., the two most prevalent mental health disorders among delinquent youth). In this study, Nathan Azrin and his colleagues found individualized cognitive problem-solving skills training programs and family behavior therapy to significantly improve problems associated with delinquency and drug abuse (e.g., decrease in depression, decrease in frequency of alcohol and illicit drug use, decrease in days institutionalized, increase in school and employment attendance, and decrease in misconduct). Additionally, youth and their parents reported greater satisfaction with one another.

When conduct is extreme, youth are often placed in institutional or group home settings where their conduct can be better monitored and controlled. In this regard, the Teaching-Family Model (TFM), developed by professors at the University of Kansas, is a model program. The more than 250 TFM group homes are managed by young married couples, known as "teaching parents," who have undergone extensive behavioral skills training and are certified by the Teaching-Family Association. These programs emphasize a strong positive relationship between youths and teaching parents. Treatment components include youth self-government procedures, social skills training, behavioral skills training, academic tutoring, and reinforcement systems designed to monitor school behavior (home-based token economy) and home conduct (level system). The TFM approach has proven more effective than comparison programs in school performance, offense and delinquency rates, and youth and school personnel satisfaction. However, similar to other programs, these differences dissipate when the adolescent leaves the group home.

LATER CONSEQUENCES OF DELINQUENCY AS A CHILD

Delinquent youth will often "outgrow" their problems of conduct without intervention. However, they are at greater risk for continuing to engage in more serious behaviors throughout adolescence and into adulthood, particularly when the onset of conduct problems occurs at an early age (i.e., before adolescence). These individuals are also at high risk to be later diagnosed with ASPD and other psychiatric diagnoses. Indeed, as compared with their nondelinquent counterparts, delinquent youth experience severe negative life outcomes, including lower occupational adjustment and educational attainment, poorer physical health and relationships with others, and higher rates of divorce.

CONCLUSIONS

There have been many encouraging findings and evaluations regarding the application of a variety of treatment approaches with conduct-disordered children and adolescents. Empirically supported treatments have predominately been family oriented and cognitive-behavioral or behaviorally based, and have also incorporated multiple interventions to address commonly encountered comorbid disorders (e.g., substance abuse and substance dependence.

It is important for all programs to take into account the progressive nature of conduct problems. For example, once conduct problems have been established and maintained, it becomes more difficult for changes and improvements to occur. Therefore, it is essential that treatment programs be implemented as soon as conduct problems first emerge or, ideally, prior to their onset through the implementation of prevention programming.

—Heather H. Hill and Brad Donohue

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DEMENTIA

DEFINITION

Dementia is characterized by the development of multiple cognitive deficits, including memory (deficits in learning new information or in recalling previously learned information) and at least one of the following: language (word retrieval difficulties, defects in understanding complex commands, loss of semantic knowledge), perception (problems in the identification of objects or in the recognition of familiar places), praxis (impairment in the ability to carry out complex movements), and executive functions (inability to plan and organize behavior). Calculation ability defects and conceptual difficulties are also commonly found. These deficits are usually progressive but in some cases are static. Dementia also comprises personality and emotional changes. Lack of awareness of the cognitive defects is frequently found. Psychiatric symptoms such as delusional ideation and hallucinations also might develop. As the disease progresses, these deficits impair the social and occupational functioning of the individual.

DIFFERENTIAL DIAGNOSIS

The acquired component of dementia distinguishes it from congenital mental retardation. The diagnosis of dementia requires a decline from the previous level of functioning. Dementia should be distinguished from delirium, which is an acute impairment of cognitive and behavioral functioning with fluctuating disturbance of attention. Delirium lasts hours or days; in dementia, a relatively stable symptomatology is found. Dementia is more frequently seen in the elderly, and it needs to be differentiated from the age-related cognitive changes that are characteristic of normal aging. Normal elderly individuals frequently suffer from memory decline, but other cognitive areas are usually better preserved. Memory defects in normal aging are observed in the memory recall stage (poor retrieval of nouns and proper names, but improvement is seen with recognition or cueing) rather than in the storage of new information. Severe depression in elders may mimic a dementia (pseudo-dementia). Depression affects all measures that depend on speed, effort, and attention; memory retrieval difficulties are also frequent. Contrary to dementia patients, depressed patients are usually aware of their memory problems and complain about them. It is important to note that depression might coexist with dementia and that depression can be a major feature of many dementia types, particularly fronto-subcortical dementias.

PREVALENCE

Dementia increases sharply with age. Most dementias are found in people older than 65. The prevalence for all dementias is over 2% by age 65 and over 30% for those 85 or older. Fifty percent to 70% of the cases of dementia correspond to an Alzheimer-type dementia; approximately 35% have pure Alzheimer's disease (AD); the remaining have AD associated with vascular disease or Lewy body pathology. The second most common type of dementia is vascular dementia, making up 10% to 30% of the dementia cases. The prevalence of frontotemporal dementia has been estimated at 5%. The prevalence of other types of dementia is less clear.

SUBTYPES OF DEMENTIA

Several classifications of dementia have been proposed. They can be divided into cortical versus fronto-subcortical dementias based on clinical characteristics. Cortical dementias, such as AD, affect language, memory, praxis, perception, spatial skills, and executive functions; they involve the cerebral cortex. Most of the other dementias (i.e., Parkinson's, Huntington's, vascular, Lewy body, and human immunodeficiency virus [HIV] dementias) engage the fronto-subcortical structures (thalamus, caudate, and subcortical white matter), and the predominant features are lack of motivation, attentional difficulties, movement disorders, and slowing of cognition. Dementias can also be classified based on the etiology or cause of the dementia. There are degenerative dementias such as AD, Parkinson's disease dementia, and Huntington's disease dementia. Vascular dementias result from cerebrovascular insufficiency in different parts of the brain. Other types of dementias are infectious dementias produced by viruses, bacteria, fungi, and parasites. Examples are HIV-associated dementias, neurosyphilis, Lyme disease, herpes encephalitis, and cysticercosis. Prion dementias, such as Creutzfeldt-Jakob disease, are produced by small proteinaceous infectious particles that produce spongiform disease of the brain. Toxic-metabolic dementias are seen in cases of prolonged exposure to neurotoxins (alcoholic dementia, Wernicke-Korsakoff syndrome) or lengthened metabolic disruptions (hepatic encephalopathy, dialysis dementia, chronic hypoxia). Other types of dementia are traumatic, secondary to repeated blows to the head, and neoplastic, secondary to large brain tumors. Cognitive deficits are frequently associated with some psychiatric conditions and can produce psychiatric-related dementias. Depression, for example, presents psychomotor retardation and cognitive impairment that in most cases are rather secondary to the mood impairment than to a real dementia. The term *pseudodementia (mimic dementia)* has been used to describe the cognitive changes observed in depression. When dementia and depression coexist, the cognitive deficits are more severe. There is also dementia associated with bipolar disorders and schizophrenia.

CHARACTERISTICS OF THE MOST FREQUENT TYPES OF DEMENTIA

Alzheimer's disease is characterized by the presence of progressive cognitive decline in at least two cognitive domains. The decline in memory with deficits in episodic memory that progresses to amnesia is characteristic of AD. Word-finding difficulties that evolve into an anomia (poor naming) and impaired comprehension are usually observed. Visuospatial difficulties and inability to perform learned movements (apraxia) constitute another important characteristic of AD. In addition, AD is characterized by personality and social changes such as lack of initiative, decreased motivation, indifference, and apathy. AD has important hereditary components.

Vascular dementia includes a group of dementing disorders that results from cerebrovascular insufficiency such as thromboembolism or multiple cortical or subcortical strokes and hemorrhagic events. Risk factors for vascular dementia are advancing age, male gender, a history of hypertension, and previous strokes. The dementia characteristics of vascular dementia depend on the site of the lesions. Cortical lesions produce a cortical dementia type with symptoms of amnesia, agnosia, aphasia, and apraxia. Subcortical lesions, on the other hand, are characterized by psychomotor symptoms and attentional and behavioral difficulties.

Frontotemporal dementia is characterized by severe personality and behavioral disturbances that usually precede the cognitive decline.

ASSESSMENT OF DEMENTIA

Dementia is a behavioral and cognitive syndrome, and its diagnosis is based on observable deficits that can be evaluated and measured through cognitive

assessment, clinical observation, and neuropsychological evaluation. The cognitive and behavioral assessments must be interpreted in the context of the neurologic examination. The presence of motor disturbances, for example, points toward a more frontosubcortical dementia, while normal motor examination results plus cognitive deficits point to a cortical dementia. In addition, laboratory tests such as blood tests, urinalyses, and thyroid tests, as well as neuroimaging procedures (computed tomography or magnetic resonance imaging) help to establish the differential diagnosis among dementia syndromes.

TREATMENT OF DEMENTIA

The treatment of dementia has two components. One is the pharmacological treatment directed to the patient who suffers from dementia. The other component is the dementia management directed toward the family and caregivers.

Pharmacological Treatment

The pharmacological treatment of dementia varies depending on the etiology of the dementia. In the majority of cases, the conditions associated with dementia have no cure, but management of the symptoms or prevention can be undertaken. In the case of AD, researchers have identified some factors that can reduce the risks for developing AD; for example, preventing head injuries, exercising regularly, and using agents that reduce oxidative injury such as vitamin E. The fact that the brains of AD patients present a decrease in the levels of acetylcholine has led to the use of medications that increase the action of this neurotransmitter with very modest results. The treatment for vascular dementia includes the management of hypertension and the prevention of new strokes by using anticoagulants, cerebral vasodilators, and selective thrombin inhibitors. Dopaminergic therapy has been useful with motor and cognitive symptoms of Parkinson's dementia and Lewy body dementia. Infectious dementias are treated with antibiotics.

Nonpharmacological Management

The patient usually loses insight, and in most cases the impact of dementia is greater for the family than for the patient. The family and caregivers need to learn how to manage the patient through the cognitive and behavioral gradual decline. Caregivers slowly assume the patient's activities of instrumental living such as shopping, cooking, and driving. They also assist the patient in daily living activities such as dressing, eating, bathing, and toileting. Caregivers should promote functional independence by skills practice, positive reinforcement, and assistance of occupational and physical therapy. However, it is recommended to structure the patient's activities and to avoid changes in routine. Dementia patients should also be cognitively stimulated. Memory aids, notebooks, pegboards, and word association have been shown to be useful in cases of dementia. The family needs to learn how to maintain good communication and appropriate interaction with the patient. Behavioral disturbances, particularly irritability, aggression, and delusions, frequently require the patient's hospitalization. The family can learn to identify the precipitating factors of behavioral aggression, and family interventions can help to reduce the frequency of these events. Family education and counseling are essential to improve caregiver satisfaction and to delay nursing home placement. Family members also require legal counsel. After patients lose their decision-making capacity, the presence of a legal representative for health care decisions is important.

—Monica Rosselli

See also Alzheimer's Disease

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DEPENDENT VARIABLE

In a scientific experiment, a researcher investigates whether changes in one or more independent variables have an effect on one or more dependent variables. A dependent variable is what is assessed as an outcome or effect of the study. It is a variable because the measure can take on some range of values. It is called dependent because it is hypothesized to be affected by

changes in the independent variable. The direction of the presumed effect is always the same: from the independent variable to the dependent variable.

For example, suppose that a researcher is interested in whether noise distracts children from efficient processing of information. A relevant experiment might involve testing children in three conditions: silence, mild noise, and moderately loud noise. The test might involve presenting a series of test trials in which each child is shown a set of digits (numbers), presented one at a time. After each set, the child is asked to say aloud as many as possible of the digits in that set, in the order presented. Some of the trials would occur with silence in the testing room, other trials would occur with some mild amount of background noise in the room, and other trials would occur with moderately loud background noise. In this experiment, the dependent variable is the outcome measure, namely, the number of digits correctly recalled. The researcher might hypothesize that the children would recall the most digits in the silent condition and the least digits in the moderate noise condition. If these results occurred, the researcher would conclude that the independent variable (noise condition) caused changes in the dependent variable (digit memory).

There are many kinds of measures that can function as dependent variables in psychological studies. A dependent variable can be a measure of behavior, such as performance on a test or reaction time to a stimulus. It can be a self-report measure, such as responses on a personality or attitude assessment. It can be a physiological measure, such as a change in brain waves or in levels of a hormone.

Dependent variables must be identified by examining the design of an experiment. That is, some variables could potentially function as independent or dependent variables, depending on the proposed pattern of cause and effect and on the way the variables are used in the experiment. For example, sugar consumption might be an independent variable in a study where you examine the effects of sugar on memory abilities by varying and controlling the amount of sugar eaten by groups of people over some time period and testing their memories. Sugar consumption might be a dependent variable in a study in which you compare a group of children who received specific nutritional classes to a control group of children who did not receive such classes, and you subsequently measure the amount of sugar consumed.

In selecting a dependent variable, researchers must consider the reliability and validity of the measure. Reliability refers to whether the measure has stability. That is, if the study were repeated, would the measure be similar? If other responses that assessed the same task were used, would those measures show a similar response pattern to the initial measure used? Validity refers to whether the measure accurately reflects what was intended to be tested. For example, infant's attention may be operationally defined by the dependent variable of looking duration, as long as there is reason to argue that looking time accurately reflects infants' attention.

—Marie T. Balaban

See also Experiment, Experimental Method

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DEPRESSION

The depressive disorders are characterized by a persistent sad or unhappy mood. Sometimes these disorders are referred to as the unipolar depressions. The current version of the *Diagnostic and Statistical Manual of Mental Disorders,* fourth edition, text revision (*DSM-IV-TR*), published by the American Psychiatric Association (2000), identifies two primary depressive disorders: major depressive disorder (MDD) and dysthymic disorder (DD). MDD is an acute form of depression in which the individual is extremely sad, discouraged, or blue for at least 2 weeks. In contrast, DD involves a chronically depressed mood of at least 2 years in adults, and of at least 1 year in children. Thus, MDD is distinguished by its severity, whereas DD is notable for its chronicity. MDD and DD can have their

onset at any point in life, and there is a substantial overlap of symptomatology between the two disorders.

There are a number of key psychological symptoms observed in both MDD and DD. First and foremost, individuals with these disorders display depressed mood, in which the person is sad, hopeless, or down in the dumps. In younger children, depressed mood may emerge as irritability, crankiness, and destructive behaviors, rather than as the sad affect typically observed in adults. Also, depressed individuals may display anhedonia, or a loss of interest in normally pleasurable activities. For example, an adult may report losing interest in hobbies or decreased sex drive. Likewise, parents may describe a depressed child as socially withdrawn. Another psychological symptom often seen in depression is psychomotor agitation/retardation. In psychomotor agitation, the person may pace or wring his or her hands. In psychomotor retardation, the individual may have slowed speech or body movements. Additionally, feelings of worthlessness and guilt are commonly seen in depression. For example, depressed people may be overly self-critical, exaggerate their responsibility for negative events, or focus on their personal failings. Finally, thoughts of death and suicidal behavior are sometimes seen in individuals who are depressed. Indeed, depressed people may think about dying or about suicide, and in some instances may even have a plan for killing themselves.

In addition to these psychological indicators, there is also a range of biological symptoms associated with depression. For example, depressed individuals may experience appetite changes that produce substantial weight loss or weight gain. Also, sleep disturbances may be noted. The most common of these is terminal insomnia, in which the person wakes up a few hours too early each morning and is unable to fall back asleep. Energy disturbances such as chronic tiredness or fatigue upon mild physical exertion are a common biological symptom of depression. Finally, many individuals who are depressed often say that they that have difficulty concentrating. For example, they may complain of being easily distracted or of problems remembering things.

Depression can begin at any point in life, although the most common age of onset is in the mid-twenties. The symptomatology of depression tends to vary across the life span. In children, certain symptoms are more common, such as irritability, social withdrawal, and somatic complaints (e.g., stomachaches). Sleep problems and psychomotor retardation are rarely observed in young people. In contrast, depressed adults are more likely to evidence the classic symptom of depressed affect, along with the full range of symptomatology described earlier.

Depression is a very common disorder and approximately 20% of adults will experience at least one episode of depression in their lives. Depression is less common among young people, with prevalence rates ranging between only 1% and 8% of children. More females than males evidence depression, although this gender difference is not apparent until puberty.

THEORIES OF ETIOLOGY

The predominant etiological models used to understand the causes of depression include the psychoanalytic, cognitive, behavioral, interpersonal, and biological perspectives. Each of these etiological models is briefly summarized here.

Psychoanalytic Theory of Depression

According to Freud, depression has its origins in childhood. Freud hypothesized that when a child experiences loss through separation or withdrawal of affection, he or she begins to harbor negative feelings toward that person. Eventually, the child's anger toward the loved one is turned inward. Consequently, the classic psychoanalytic view of depression involves anger turned inward against the self. In contrast, modern psychoanalytically oriented attachment theorists believe that disruption of the infant-caretaker bond early in life (e.g., at 18 months) can produce a vulnerability to developing depression later in life.

Beck's Cognitive Theory of Depression

In cognitive explanations of depression, thoughts and beliefs are considered to have a major role in causing or influencing the emotional state. According to Beck, depression results from faulty schemata or belief systems about the self and world. These negative schemata are evident in a pattern of thinking called the negative triad, which involves a negative view of the self, the world, and the future. Negative schemata produce characteristic distortions in thinking, such as the tendency to magnify the potential consequences of a negative event. Later in life, individuals filter events through these cognitive distortions, which can lead to depression.

Helplessness and Hopelessness Theories

According to the learned helplessness theory, an individual's sense of being unable to act or control aversive events results in expectations of helplessness, in turn leading to depression. Eventually, this model evolved into the hopelessness theory of depression. Hopelessness, or a general expectation that negative events will occur and that nothing can be done about them, is said to be the cause of some types of depression. Hopelessness results from the different kinds of inferences that a person makes about negative life events. These inferences include the causes of the event, the consequences of the event, and the self.

Interpersonal Theory of Depression

Depressed individuals tend to have few social networks and perceive them as providing little support. This reduced social support can lessen an individual's ability to cope with negative life events, making these people even more susceptible to depression. Furthermore, depressed individuals tend to elicit more negative reactions from others, thereby validating their negative self-concept.

Biological Theories of Depression

Several biological causes have been implicated in the etiology of depression. It is well known that depression tends to run in families. Twin studies have shown higher concordances of depression in monozygotic than in dizygotic twins, suggesting a genetic component. Additionally, the effectiveness of drug therapies for depression suggests a biological component. Furthermore, levels of the stress hormone cortisol are higher in depressed persons than in those who are not depressed. These various sources of evidence suggest a strong biological underpinning to depression.

TREATMENT OF DEPRESSION

Psychodynamic Therapies

According to psychoanalytic theory, depression results from feelings of loss and anger that have been turned inward by the individual. Therefore, the goal of psychoanalytic therapy is to help the patient to uncover the unconscious sources of his or her depression. During therapy, the patient works to uncover these feelings of loss and anger and is then able to achieve insight into his or her feelings and express the unconscious conflicts. Unfortunately, there have been few controlled studies evaluating the effectiveness of psychoanalysis for treating depression.

Beck's Cognitive Therapy

According to Beck, errors in an individual's thinking are the cause of poor self-esteem and depression. The goal in cognitive therapy is to change the patients' maladaptive ways of thinking by teaching him or her new, more successful thought patterns. The patient is active in his or her own treatment by learning to monitor internal monologues and to identify distorted thought patterns that contribute to depression. Much research has been done evaluating the efficacy of Beck's cognitive therapy, and evidence suggests it is helpful in alleviating depression.

Social Skills Training

This therapy focuses on enhancing the social skills of a depressed individual, thus helping the patient have more enjoyable social interactions and experiences with others. The patient learns new ways to interact with others, such as the ability to stand up for one's rights through assertiveness training.

Biological Therapies

Antidepressant medication is the most commonly used biological treatment for depression. There are three major categories of drugs: (a) tricyclics, (b) selective serotonin reuptake inhibitors (SSRIs), and (c) monoamine oxidase inhibitors (MAOIs). The tricyclics and SSRIs work by blocking the reuptake of neurotransmitters such as serotonin, whereas the MAOIs work by blocking the action of an enzyme that breaks down the key neuorotransmitters. Although the effectiveness of all three classes of drugs is similar, the SSRIs, which include Prozac and Zoloft, are associated with fewer side effects.

Electroconvulsive therapy (ECT) is sometimes used with patients who do not respond to medication or who are severely depressed. The procedure involves inducing a seizure in the patient by passing 70 to 130 volts of electricity through the right hemisphere of the brain. Unfortunately, the side effects of ECT include memory loss and confusion, but it may be the best treatment when all other therapies have failed.

Nontraditional Therapies

Recently, individuals suffering from depression have sought new avenues of relief. Some of these therapies include exercise, which has been found to be successful in treating depression. Also, a B vitamin called folate, when administered with drug therapy, can enhance the effectiveness of antidepressants and reduced the side effects associated with the drugs. Additionally, the herbal supplement Saint Johns wort has been shown to be as effective as antidepressants in alleviating depression, although the mechanism of action is not clearly understood.

—Leonard S. Milling, Alison America, and Jacqlyn M. Tumolo

See also Psychopathology

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DEVELOPMENT

Development is systematic change over time. In humans, development is the sequence of physical and psychological changes that occurs as people age. Scholars have studied human development with regard to physical growth and maturation, motor functioning, perceptual capacities, cognitive capacities and skills, emotional repertoire and functioning, social relationships, moral capacities and tendencies, and psychopathology, among other attributes. Specific examples of development include the development of the brain in both structure and function, improvements in vision in the first months of life, infants' advancement from crawling to walking, children's acquisition of memory strategies, toddlers' acquisition of social emotions such as guilt, young children's progression from parallel play to social play, and changes in moral reasoning in adolescence and adulthood.

Changes considered to be developmental are typically progressions that result in enhanced, more complex, and more organized structures and functioning. Human prenatal development, from zygote to embryo to fetus, exemplifies such a progression. Toddlers' developing language abilities are similarly progressive, enabling children to better interact with their caretakers and more clearly express their needs. Adolescents' improved logical reasoning permits a more comprehensive and systematic consideration of hypothetical situations. However, regressive changes may also be considered developmental, such as the lessening of visual acuity in older individuals that results from aging eye structures. This example further illustrates that development can be viewed as lifelong. Although physical and psychological development is most obvious in infancy and childhood, changes occurring later in the life span have been characterized as development. Changes occurring in early, middle, and late adulthood in relationships, intimacy, memory, and perception, among other topics, have been the focus of developmental research. Developments in adulthood include both losses, such as those with regard to perception, and gains, such as the acquisition of wisdom.

Scientific efforts to understand physical and psychological development are directed at description and explanation. Characterizations of development vary with regard to whether development is viewed as continuous or discontinuous, that is, whether changes are gradual, quantitative, and incremental, or whether they are qualitative and stagelike. A child who becomes a baseball player might be described as gradually learning the required skills through practice. A child who, in time, judges that a ball of clay rolled into a snakelike form has not changed in amount might be described as having advanced to a qualitatively different stage of reasoning. Besides differing on the issue of continuity, developmental accounts differ as to whether development occurs in universal sequences or whether there are multiple courses of development, such as seems to be the case when children develop varying views of the relationship between individuals and society depending on the cultural context in which they are raised.

A third aspect of development that interests scholars is its determinants. Historically, theorists have disputed

whether nature or nurture is most responsible for developmental outcomes, but contemporary accounts concur that development results from interplay between endogenous forces, such as genetic constitution, and exogenous forces, such as environmental context. However, accounts continue to vary in their emphases on these influences and in their assumptions about how the factors interact, inspired in part by historical ideas from embryology and evolutionary theory as well as from early psychology. Jean Piaget's theory of cognitive development, for example, explains the increasing complexity and integrated organization of children's thinking in terms that are reminiscent of biological explanations.

Because change is the essence of development, developmental scholars often employ research methods that compare individuals of different ages (cross-sectional designs) or that permit repeated observations over time (longitudinal designs). Sometimes these research designs are combined to afford a comprehensive examination of development.

—Karen Bartsch and Brandi McCulloch

See also Continuity and Discontinuity in Development

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DEVELOPMENTAL DIRECTION

The principle of developmental direction, one of Gesell's five principles of maturation, assumes that development is not random but proceeds in an ordered and orderly fashion. The fact that development systematically proceeds from the head to the toes is a good example of how at any point a developmental trend will be more advanced in the head area than in the foot area. Thus, at birth, the newborn infant is relatively more mature in neuromotor organization in the head region than in the leg region, and coordination of the arms precedes coordination of the legs. This trend is described as the cephalocaudal (or head to tail) trend.

Another example is how development is more advanced at the center of the body compared to its periphery. The movements of the shoulders show considerably more organization early in life than the movement of the wrists and fingers. This proximodistal (or near to far) trend can also be seen in the child's grasping behavior, which at 20 weeks is quite crude and dominated by upper arm movements. By 28 weeks, however, with the increasingly sophisticated use of the thumb, the grasping is dominated by increasingly finer motor skills. Both the cephalocaudal and proximodistal trends illustrate Gesell's contention that development (and behavior) have direction and that this direction is basically a function of preprogrammed genetic mechanisms.

—Neil J. Salkind

See also Maturation

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DEVELOPMENTAL DISABILITIES

The 9 months that precedes the birth of every child involves an amazing process. From the moment an egg is fertilized to the birth of an infant, so many complicated steps have occurred. In each step, there are many chances for errors to happen. Yet the surprise is not the number of children born with birth defects, but the number of children who are born healthy.

A number of events that consequently affect a child's development can go wrong, including genetic abnormality, cell division, growth before birth, maternal nutrition, congenital malformation, infections, and teratogens (any agent that causes a defect in the fetus, such as radiation and drugs).

Developmental disabilities are a diverse group of physical, cognitive, psychological, sensory, and speech impairments that begin anytime during the development up to 18–22 years of age (depending on various state and federal definitions). In most instances, the cause of disability is not known.

DEFINITION

The definition used by federal agencies of developmental disabilities is severe, chronic, or unending disabilities of a person that (1) are attributable to a mental or physical impairment or combination of mental and physical impairments; (2) are apparent before the person attains the age of 22; (3) are likely to continue indefinitely; (4) result in substantial functional limitations in three or more of the following areas of major life activity—(a) self-care, (b) receptive and expressive language, (c) mobility, (d) self-direction, (e) capacity of independent living, and (f) economic self-sufficiency—and (5) reflect the person's need for a combination and sequence of special, interdisciplinary, or generic care, treatment, or other services that are of lifelong or extended duration and are individually planned and coordinated.

DEVELOPMENTAL DIAGNOSES

Attention Deficit Disorder with or Without Hyperactivity

The core symptoms of attention deficit/hyperactivity disorder are developmentally inappropriate levels of inattention, hyperactivity, and impulsivity. These problems are persistent and usually cause difficulties in one or more major life areas: home, school, work, or social relationships.

Autism, Pervasive Developmental Disorders

A diagnosis of autistic disorder is made when an individual displays 6 or more of 12 symptoms listed across three major areas: social interaction, communication, and behavior. When children display similar behaviors but do not meet the criteria for autistic disorder, they may receive a diagnosis of pervasive developmental disorder, not otherwise specified.

Cerebral Palsy

Cerebral palsy (CP) is a condition caused by injury to the parts of the brain that control our ability to use our muscles and bodies. *Cerebral* means having to do with the brain. *Palsy* means weakness or problems with using the muscles. Often the injury happens before birth, sometimes during delivery. CP can be mild, moderate, or severe. Mild CP may mean a child is clumsy. Moderate CP may mean the child walks with a limp. He or she may need a special leg brace or a cane. More severe CP can affect all parts of a child's physical abilities. Usually, the greater the injury to the brain, the more severe the CP. However, CP does not get worse over time, and most children with CP have a normal life span.

Deafness/Hearing Impairments

Sound is measured by its loudness or intensity (measured in units called decibels, dB) and its frequency or pitch (measured in units called hertz, or Hz). Impairments in hearing can occur in either or both areas and may exist in only one ear or in both ears. Hearing loss is generally described as slight, mild, moderate, severe, or profound, depending on how well a person can hear the intensities or frequencies most greatly associated with speech.

Down Syndrome

Down syndrome is the most common and readily identifiable chromosomal condition associated with mental retardation. It is caused by a chromosomal abnormality, an accident in cell development that results in 47 instead of the usual 46 chromosomes. This extra chromosome changes the orderly development of the body and brain.

Emotional Disorders

Many terms are used to describe emotional, behavioral, or mental disorders. Children are said to have emotional disorders when their lives and education are significantly adversely affected by (a) an inability

to learn that cannot be explained by intellectual, sensory, or health factors; (b) an inability to build or maintain satisfactory interpersonal relationships with peers and teachers; (c) inappropriate types of behavior or feelings under normal circumstances; (d) a general pervasive mood of unhappiness or depression; or (e) a tendency to develop physical symptoms or fears associated with personal or school problems.

Epilepsy

Epilepsy is a physical condition that occurs when there is a sudden, brief change in how the brain works. When brain cells are not working properly, a person's consciousness, movement, or actions may be altered for a short time. These physical changes are called epileptic seizures. Epilepsy is therefore sometimes called a seizure disorder. Epilepsy affects people in all nations and of all races. Some people can experience a seizure and not have epilepsy (e.g., febrile convulsion). A single seizure does not mean that the person has epilepsy.

Learning Disabilities

Learning disability is a general term that describes specific kinds of learning problems. A learning disability can cause a person to have trouble learning and using certain skills. The skills most often affected are reading, writing, listening, speaking, reasoning, and doing math.

Mental Retardation

Mental retardation is a term used when a person has certain limitations in mental functioning and in skills such as communicating, taking care of himself or herself, and social skills. These limitations will cause a child to learn and develop more slowly than a typical child. Mental retardation is diagnosed by looking at two main things: (a) the ability of a person's brain to learn, think, solve problems, and make sense of the world (called IQ or intellectual functioning); and (b) whether the person has the skills he or she needs to live independently (called adaptive behavior or adaptive functioning).

Speech/Language Impairments

Speech and language disorders refer to problems in communication and related areas such as oral motor function. These delays and disorders range from simple sound substitutions to the inability to understand or use language or use the oral-motor mechanism for functional speech and feeding. Some causes of speech and language disorders include hearing loss, neurological disorders, brain injury, mental retardation, drug abuse, physical impairments such as cleft lip or palate, and vocal abuse or misuse. Frequently, however, the cause is unknown.

Spina Bifida

Spina bifida means "cleft spine," which is an incomplete closure in the spinal column. In general, the three types of spina bifida (from mild to severe) are (a) spina bifida occulta, (b) spina bifida meningocele, and (c) myelomeningocele. The effects of spina bifida may include muscle weakness or paralysis below the area of the spine where the incomplete closure (or cleft) occurs, loss of sensation below the cleft, and loss of bowel and bladder control. In addition, fluid may build up and cause an accumulation of fluid in the brain (a condition known as hydrocephalus).

Traumatic Brain Injury

Traumatic brain injury (TBI) is an injury to the brain caused by the head being hit by something or by being shaken violently. This injury can change how the person acts, moves, and thinks. A traumatic brain injury can also change how a student learns and acts in school. The term *TBI* is not used for a person who is born with a brain injury. It also is not used for brain injuries that happen during birth.

Visual Impairments

The terms *partially sighted, low vision, legally blind,* and *totally blind* are used in the educational context to describe students with visual impairments. Visual impairment is the consequence of a functional loss of vision, rather than the eye disorder itself. Eye disorders that can lead to visual impairments can include retinal degeneration, albinism, cataracts, glaucoma, muscular problems that result in visual disturbances, corneal disorders, diabetic retinopathy, congenital disorders, and infection.

SUMMARY

Developmental disabilities affect the lives of nearly 4 million Americans. Developmental disabilities are

severe, chronic disabilities attributable to mental, physical, sensory, and speech impairment that begin before ages 18 to 22. Significant limitations in three or more areas result from developmental disabilities: self-care, receptive and expressive language, learning, mobility, self-direction, capacity for independent living, and economic self-sufficiency, as well as the continuous need for individually planned and coordinated services.

—Asiah Mason and Michelle Smith

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DEVELOPMENTAL PSYCHOPATHOLOGY

WHAT IS DEVELOPMENTAL PSYCHOPATHOLOGY?

Pioneers of developmental psychopathology Sir Michael Rutter and Alan Sroufe offered that the field of developmental psychopathology is the study of the origins and course of individual behavioral adaptation, with special emphasis given to the *how* of developmental processes. Thus, the overarching questions asked by developmental psychopathologists include: How does psychopathology develop and how does this differ for individuals with different characteristics? How does a person's development affect psychopathology? How does psychopathology affect a person's development? We will briefly consider what is meant by *psychopathology* and then consider why it is critical that *psychopathology* and *developmental* be linked.

What Is Psychopathology?

Although a variety of conceptualizations are possible, what most scholars mean when they refer to psychopathology is abnormal behavior—what is variously called emotional/behavioral problems, psychiatric disorders, or psychological syndromes. While there remains debate regarding the intricacies of classification of psychopathology, there is much consensus and empirical support for what constitutes common syndromes of problems—depression, anxiety, autism, schizophrenia, and antisocial behavior are all generally accepted classes of behavior that are considered to be abnormal in and of themselves or when exhibited in excess. By abnormal we mean that these behaviors are maladaptive for either the individuals themselves or for society. By excess we mean a higher level of symptoms than exhibited by most individuals. Most people feel sad from time to time and many people occasionally break the law (i.e., drive too fast), but most people do not feel so sad and down that they cannot get out of bed for days on end, and most people do not repeatedly break the law and regularly violate the basic rights of others. It is the latter behavior, which violates societal norms, makes the person miserable, or renders one incapable of caring for oneself or others, that is defined as abnormal behavior, or psychopathology.

Importance of Development

Why is it so critical that inquiry regarding psychopathology be developmental? Historically, the two concepts have not been linked, yet development is central to what we now know about how psychopathology works. Normal development presents individuals with frequent challenges in every domain of life (behavioral, cognitive, emotional, social, physical), that once mastered constitutes growth—this is how babies become children and children become adults. For example, toward the end of the first year of life, infants become aware that there is a large and fascinating world out there that other people move around in. More importantly, they come to understand that they are people—thus, if they could move around, they could partake in the fun. However, infants must learn how to crawl,

stand, and eventually walk in order to fully interface with this stimulating environment. This is a challenge for an infant, who does not just wake up one morning capable of walking. The infant must try and fail repeatedly before mastering this new skill. Virtually all infants eventually master it and become capable walkers. However, some infants are very large or have low muscle tone and the challenge is more difficult for them than for other children, and thus they walk later than other children. It is likely that for many of these late walkers, other gross motor tasks may be somewhat difficult for them as well, and thus the next developmental challenge that comes along involving gross motor skills or large muscle strength may also be a larger hurdle for them than for other children. Current research and theory suggest that this is how psychopathology operates as well. Some children have or develop emotion regulation problems that make developmental challenges involving or requiring emotion regulation difficult for them. While such a child may eventually make it through a particular emotion-related challenge with support, this area will likely remain an area of vulnerability for the child, and when the next emotion-related developmental challenge arises, the child may have difficulty again. Mindfulness of developmental challenges can help parents or teachers anticipate hurdles for vulnerable children and provide preemptive support to help the child through subsequent challenges and minimize disruptions. Thus, there is much to be gained by including development in the conceptualization and study of psychopathology.

History of Developmental Psychopathology

While interest in description, classification, and treatment of psychological problems is not new, the field of developmental psychopathology is considered to have emerged primarily in the past three decades. This area of inquiry has its roots in several disciplines concerned with human behavior, including developmental psychology, clinical psychology, and psychiatry, and its links to these disciplines remain strong. However, it is now considered to be a unique field of science that has fundamentally changed child mental health research and policy.

To some degree, the field arose because of growing dissatisfaction with prevailing models of psychopathology that often left children out of the equation. The dominant diagnostic system (*Diagnostic and Statistical Manual of Mental Disorders*) gave almost no consideration to development in the guidelines set forth for diagnosis of psychopathology. It was assumed that children either did not experience true psychopathology or that if they did, it would look very much the same as psychopathology in adults. Several landmark publications and meetings have elaborated on this concern and/or offered solutions for how to improve the study of psychopathology. Thomas Achenbach's 1974 textbook entitled *Developmental Psychopathology* introduced the idea that childhood psychopathology should be viewed as separate and distinct from adult psychopathology. Michael Rutter and Norman Garmezy are credited with charting the course of future inquiry for developmental psychopathology with their 1983 chapter on the topic in the *Handbook of Child Psychology*. Next, the 1989 Rochester Symposium on Developmental Psychopathology brought together and unified a diverse array of scholars whose work on psychopathology was explicitly developmental in scope and approach. Finally, the establishment of a journal in 1990 devoted exclusively to the topic, *Development and Psychopathology,* cemented the foundation of developmental psychopathology as a unique field unto itself. Developmental psychopathology has been an exciting and active area of research ever since.

KEY ISSUES IN DEVELOPMENTAL PSYCHOPATHOLOGY

Diagnosis and Classification

The most basic question that developmental psychopathology is charged with answering is: What grouping of symptoms makes up a disorder? There are at least two approaches to answering this question: the top-down and bottom-up approaches. The top-down approach starts with the assumption that psychiatric diagnoses exist and, importantly, that we know what they are. Thus, the task at hand is to name the disorders and describe the set of symptoms that defines each one. The dominant nosology in American psychiatry was derived from a top-down approach: The *Diagnostic and Statistical Manual of Mental Disorders,* fourth edition (*DSM-IV*), is a catalog of hundreds of psychiatric disorders used by clinicians to diagnose patients. The bottom-up approach to classification starts at an entirely different place: It starts with an observation of all of the different types of symptoms that people report and uses statistical analysis to see how symptoms tend to group

together to form syndromes. A major alternative to the *DSM-IV* can be found in these empirically based taxonomies, exemplified by the Achenbach system of empirically based assessment, where symptoms group into eight syndromes ranging from aggressive behavior to social withdrawal. Each of these approaches has strengths and weaknesses, and both are used currently. However, debate remains about which approach is most useful and accurate. Some developmental psychopathology researchers rely on the top-down *DSM-IV* approach and study psychological disorders such as autism or panic disorder, while many opt for the bottom-up approach and focus on syndromes or groupings of symptoms, such as anxiety or antisocial behavior. At one level, the differences between *disorder* and *syndrome* are semantic—we hope that in the end we are all studying the same underlying problematic processes. At another level, however, our definitions shape and constrain the questions we ask. Thus, for example, studying only disorders may preclude the possibility of finding that the underlying biological mechanism of all psychopathology is the same and it is various cultural, social, and environmental factors that determine what form of psychopathology emerges. Alternatively, studying only syndromes could preclude the possibility of attending to qualitatively different groups of individuals whose functioning is so far outside the typical range that they need special research attention, such as persons with schizophrenia. For the purposes of this chapter, we will go with the first assumption: Both types of inquiry will lead to roughly the same place in the end, an understanding of maladaptive behavior in its many forms.

Risk, Resiliency, and Etiology

Much developmental psychopathology research is aimed at answering the question of etiology, or what causes psychopathology. Central to this line of inquiry are the concepts of risk and resiliency. What is risk? A developmental psychopathologist rarely asks the question "What causes disorder x?" expecting a simple answer. As with heart disease, there is no one cause. Some people appear to be vulnerable to developing heart disease because they are related to someone with heart disease—thus they are at genetic risk. However, being at genetic risk is not enough. It is a vulnerability that can be triggered by environmental stimuli, such as too much stress, being overweight, or having hypertension. The misconception that genes are destiny is fundamentally wrong—genes are probabilistic, not deterministic, when it comes to psychopathology. Most forms of psychopathology appear to operate in a very similar fashion to heart disease. Risk for psychopathology comes in many forms: genetics is one form, but histories of trauma, growing up in poverty, parental psychopathology, and interparental conflict also make some individuals more likely to develop certain forms of psychopathology than those without such a history.

What is resiliency? Resiliency can be defined as thriving despite having serious risk factors. Emmy Werner and Ruth Smith conducted an extensive 40-year study of factors related to positive development in a cohort of almost 700 children born in 1955 on the Hawaiian island of Kauai. Eighty percent of the study children experienced multiple risk factors, including persistent poverty, parental alcoholism, parental psychopathology, and low parental education. Most of the children in this high-risk group experienced significant emotional, behavioral, academic, and/or occupational problems in childhood and beyond. However, 30% of this group showed none of these adverse life outcomes and in fact were thriving in childhood, adolescence, and adulthood. Werner and Smith documented the factors that made these children stand out from the rest—the factors that protected these children. They identified five personal protective factors and five environmental protective factors. Personal protective factors were autonomy/social maturity, school competence, easy/extroverted temperament, self-efficacy, and good physical health. Environmental protective factors included maternal competence; emotional support in childhood, adolescence, and adulthood; and fewer stressful life events. Thus, competence and emotional support appear to be strengths that vulnerable children can draw on to be successful and healthy despite significant adversity.

Diathesis-Stress Model

A key theory espoused in much developmental psychopathology research and theory explicitly or implicitly is that of the diathesis-stress model. While this theory was originally developed as a theory specific to development of depression, it has broad applicability for a number of forms of psychopathology. Individuals develop diatheses (vulnerabilities) to psychopathology as a result of exposure to risk factors such as genetics, biological or environmental insults, child abuse/neglect,

or poverty. Vulnerabilities come in a variety of forms ranging from innate temperamental characteristics to problematic thinking styles, ineffective regulation of emotions/arousal, and poor problem solving. For some individuals, these vulnerabilities lie dormant for a lifetime and they never develop psychopathology. For many though, the vulnerability becomes activated under challenging or difficult circumstances. Take, for example, cognitive vulnerability to depression. A large number of studies have found that individuals with depression tend to make errors in how they think about themselves, the world, and the future. They tend to believe that they are the cause of negative things that happen to them and that they play little role in the good things that happen to them. Individuals who have this thinking style are more likely to develop depression following a negative life event than individuals without this negativistic, self-defeating thinking style. This thinking style is believed to result from previous experiences that teach an individual that they are powerless or helpless, but it does not lead directly to depression except under stressful or difficult circumstances. Thus, the negative thinking style is the diathesis that lies in wait for a stressor potent enough to activate it and create a cascade of negative thoughts and feelings.

Nature Versus Nurture No More

For years a battle has waged between those who believed that the causes of psychopathology were primarily genetic or biological and those who asserted that the environment played the major role in the etiology of psychopathology. The past two decades have seen a major shift whereby most psychopathologists recognize that genetics play some sort of role in the development of most types of psychopathology, and at the same time recognize that the environment is often what determines whether a vulnerability or trait is expressed, what form it takes, and how severe it is. Behavior geneticists emphasize that genes are probabilistic, not deterministic. A study by Avshalom Caspi and his colleagues aptly demonstrates this idea. They showed that the dopamine transporter gene (5-HTT), thought to be implicated in the development of depression, only predicted future depressive episodes in the presence of a major stressful life event. The absence of a main effect for the 5-HTT gene shows that indeed genes are not destiny. Some genes need to be activated, as do other diatheses. If there is no trigger for the gene, there will be no depression. Similarly, a study by Eric Turkheimer and colleagues at the University of Virginia showed that extreme poverty reduced the genetic influence on IQ to nonsignificance. In this case, the substantial and robust finding that approximately 70% of the variance in IQ scores can be explained by genetics received a noteworthy caveat: not in extreme environmental circumstances. Poverty has the power to suppress a child's genetic IQ potential to such an extent that aspects of the environment explain more variance in the IQ score than does heritability. These two studies illustrate the power of both the environment and genetics in determining psychological traits—in fact, these studies illustrate how woefully inadequate our explanations of psychopathology would be if we ignored either side of the equation.

Temperament

Infants are born with different styles of reactivity and self-regulation. Some babies are easy to soothe; regular in their eating, sleeping, and elimination habits; and quick to smile. Other babies are irritable and easily upset, irregular in their habits, and hard to engage in smiling or cuddling. Alexander Thomas, Stella Chess, and Herbert Birch observed that these characteristics, which they called temperament, appear at birth, remain stable over time, and place some individuals at risk for psychopathology. They categorized infants on nine dimensions of temperament ranging from activity level to adaptability, and they identified several groups of children based on how they scored on the various temperamental dimensions. Children were categorized as having "easy" and "difficult" temperaments. Thomas and colleagues found that difficult temperament may predispose a child to negative interactions with peers, parents, and teachers, but this is not inevitable—thus, difficult temperament is only a vulnerability for psychopathology, not an eventuality. Thomas and colleagues introduced the concept of "goodness of fit" to describe the fact that parenting styles and children's temperaments may match well and promote optimal development or may clash and cause problems. Some parents are able to respond well to a "difficult" temperament and thus protect that child in the face of their temperamental vulnerability. Much of what is currently understood to be genetic risk may lie in these constitutionally based characteristic ways that individuals interact with the world beginning in infancy.

Comorbidity

Another chief concern of developmental psychopathology surrounds what we call comorbidity. This is the co-occurrence of two or more different types of psychological problems in the same individual at the same time. Thus, for example, an adolescent who meets diagnostic criteria for both major depressive disorder and conduct disorder at the same time is said to have comorbid depression and conduct disorder. A national survey found that 14% of U.S. adults surveyed met diagnostic criteria for at least three disorders at once. There are multiple theories to explain comorbidity, and many of them are specific to the particular diagnostic pairings. For example, anxious and depressive disorders are highly comorbid, and one theory to explain this phenomenon is that anxiety and depression have a common underlying cause: a propensity to experience negative emotions (negative affectivity). Another theory is that the distinction between anxious and depressive disorders is largely artifactual—that, for most individuals, anxiety and depression are simply facets of the same problem. Thus, prone individuals are likely to feel both nervous and sad at the same time. This is an important issue to sort out for anyone interested in the nature and course of psychopathology because, for example, there are different trajectories based on whether one has depression alone or in conjunction with another disorder. It also has treatment implications—comorbidity is related to more severe pathology and worse response to treatment. We know little about how best to treat depression in the face of another disorder—Which disorder takes precedence? Do you treat one before the other? Can you treat both at the same time? These questions remain largely unanswered.

Epidemiology

Documenting how many people of what age and gender meet diagnostic criteria for what forms of psychopathology is the charge of psychiatric epidemiologists. For policy makers to estimate treatment funding needs, we need reliable data on the prevalence of psychopathology (i.e., the number of people with a psychiatric disorder at any given time). We now know, for example, that close to 50% of Americans can be expected to meet diagnostic criteria for a *DSM-IV* psychiatric disorder at some point in their lifetime. We also know that anxiety and depressive disorders are more prevalent in females and that substance use disorders and antisocial personality disorders are more prevalent in males. In addition to basic questions about which disorders are most prevalent and for whom, developmental psychopathologists are particularly interested in determining the factors that influence prevalence rates. Thus, much research has attempted to address gender differences such as why women are prone to depression. The answer is multifaceted and as yet incomplete, but at this point stressful events appear to be a primary mechanism. Women are at heightened risk for experiencing a disproportionate number of stressful events/circumstances such as sexual abuse. Frequent stressful events repeatedly activate the brain's stress response system (hypothalamic-pituitary-adrenal axis; HPA), which can cause the system to become dysregulated. Dysregulation in the HPA makes people more sensitive to future stressful events and to resulting depression. There may also be genetic vulnerabilities to dysregulation of the HPA, which further complicates understanding of this gender-based risk. This is another example of the exquisite interplay of genetic and environmental influences on psychopathology.

WHAT PROGRESS HAVE WE MADE?

Research has identified many factors that either place an individual at risk for or protect them against developing psychopathology. However, our remaining challenge is to begin finding the mechanisms of risk or the "hows" of risk. Mechanisms are often the factors that need to be targeted in intervention. For example, poverty is a substantial risk factor for the development of antisocial behavior, but not all individuals who experience poverty go on to develop psychopathology. Thus, the more we know about the factors that determine individual differences in response to poverty, the better able we are to target those most at risk with interventions. Here we review the research on antisocial behavior, one of the most common and persistent forms of psychopathology.

Antisocial behavior has received copious research attention, in part because of the social costs that result from delinquency and criminal activity. Longitudinal research has borne extremely useful information for understanding the development of antisocial behavior, from how the symptoms change with age, to the factors that place children at risk, to the different subgroups of antisocial children. The *DSM-IV* lists oppositional defiant disorder (ODD; a pattern of

negativistic, oppositional behavior), conduct disorder (CD; persistent rule breaking), and attention deficit/hyperactivity disorder (ADHD; inability to inhibit inappropriate responses) as three distinct entities with different symptom groupings. However, the preponderance of data clearly suggests that ODD and CD are the same thing—that aggression and oppositionality are the early manifestations of the disorder and that persistent rule breaking is the later manifestation of the disorder, both reflecting age-specific misbehavior. In addition, the data suggest that the impulsive inhibition problems of ADHD may also be a component of the same disorder, although this is less well established than the ODD-CD link.

Terrie Moffitt's studies following young children into adulthood were groundbreaking in showing that there are at least two distinct groups of antisocial youths. She found a relatively small group of antisocial children who were aggressive and antisocial at age 4 and remained so at every assessment until age 18 and beyond. This group of "life course persistent" antisocial children had multiple risk factors, including early aggression, impulsivity, poor peer relations, family adversity, and cognitive impairments. Their problems often progressed to adult criminality. The other major group in their study was a cadre of children who showed no antisocial behavior in childhood, but in adolescence began rule breaking at a level similar to the life course persistent group. This much larger group of "adolescence limited" antisocial children had none of the risk factors of life course persistent youths, but rather had poor parental monitoring and associated with antisocial peers. These teens tended to desist from delinquency in adulthood and rarely progressed to adult criminality. Individuals in this group did have some lingering mental health concerns in adulthood, however, such as impulsivity, substance abuse, financial problems, anxiety, and depression. There remain some important questions to be answered about delinquency in youths: Are there more than two groups of antisocial youths? Is ADHD part of a general disruptive syndrome? If so, how do we reconcile high genetic loadings for some forms of disruptive behavior (ADHD) and very low genetic loadings for other forms (adolescence limited antisocial behavior)?

WHAT DON'T WE KNOW YET?

There are a few key areas in need of the attention of developmental psychopathology researchers in the next decades. The first concerns measurement issues. Despite the recognition that it is a problem to rely only on parents or children to tell us about their symptoms, reconciling the reports of multiple informants has proven to be challenging. Parent and child reports of children's psychological symptoms tend to only be correlated at about 30%, indicating modest agreement. While a number of theories have been proposed to understand the poor cross-informant agreement on key psychological constructs, we no longer assume that any one person will be 100% accurate. The leading theory currently is that different informants are privy to different aspects of an individual's behavior; thus, each informant reports on the part that they are aware of. However, testing this theory has proven difficult and we still do not understand the mechanisms of informant disagreement—what predicts it, why it occurs, and what variations in disagreement mean vis-á-vis psychopathology.

The second area in need of future research attention involves gender differences in psychopathology. There are substantial gender differences in prevalence rates of some types of psychopathology. How much of this phenomenon is due to definitions that largely exclude one gender because they are unlikely to exhibit specific behaviors? Some researchers, for example, claim that the diagnostic criteria for conduct disorder are biased in favor of diagnosis for boys because of the overt aggressive nature of so many of the symptoms. These researchers assert that girls are antisocial as well, but that their aggression tends to be in the form of indirect or relational aggression. Thus, girls are less likely than boys to beat someone up, but they are likely to spread vicious rumors that serve to socially ostracize another girl. The current diagnostic criteria do not take such gender-based differences in behavior into account, which could account for gender-based differences in rates of conduct disorder, for example.

Finally, the brass ring of developmental psychopathology—etiology—remains out of grasp currently as we have much to learn about the causes of various forms of psychopathology. We do know that both genetics and the environment play a role in most forms of psychopathology and that these two things constantly interact, but we still do not understand the role of the mechanisms in the emergence of psychopathology. For example, if genetic vulnerability to depression operates indirectly through stress, then we need to search not for the depression gene, but rather the gene that makes individuals reactive to stress. Similarly,

we need to better understand the role of temperament and other inherited characteristics in how an individual responds to environmental challenges. We need to understand the mechanisms of environmental indicators (i.e., how do they trigger genetic or other types of diathesis?). Finally, we hope to one day fully understand the lasting biological and psychological changes created by environmental risk events.

IMPLICATIONS OF DEVELOPMENTAL PSYCHOPATHOLOGY

George Albee has written extensively about the idea that individual treatment—in the form of medication or psychotherapy—can never change incidence rates of psychopathology. He asserts that the only way to stem the tide of psychopathology is through prevention. Even if there were adequate treatment services available for every individual with psychopathology (which there are not), the individualized treatment approach will always be a zero-sum game. The way to make things better is to take the public health approach and reduce incidence rates by reducing the pathogens (causes) of disease. Thus, for psychopathology, the known causes include poverty, trauma, and abuse, and the mechanisms of these risks include emotion regulation, problem solving, coping, academic preparedness, and the stress response system. Thus, prevention efforts have begun to target these risks and mechanisms in order to reduce incidence rates of psychopathology.

The contextual developmental psychopathology approach has also encouraged a communitarian perspective on treatment and prevention to emerge. Prevention scientists are calling for community-based interventions that reduce risk factors in an entire community. Thus, approaches to prevention that draw from Afro-centric community interventions and emancipatory education are exciting directions for community-oriented developmental psychopathologists. My colleagues and I, for example, have borrowed from the Afro-centric approach and are developing an empowerment prevention model that targets, builds, and channels resistance to race, class, gender, and sexuality oppression. With this contextual approach, we hope to use the best of developmental psychopathology research and theory to prevent delinquency in the most vulnerable, most treatment-resistant youths who currently see little hope for a future not marked by jail, failure, and a perpetual cycle of abuse and marginalization. Thus, in addition to adding to our understanding of fundamental aspects of human behavior, developmental psychopathology has the promise of being transformative and making large-scale changes for the better mental health of all.

—Martha E. Wadsworth

See also *Diagnostic and Statistical Manual of Mental Disorders*

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DEVELOPMENTAL QUOTIENT

A development quotient (DQ), most frequently used with infants or preschool children, is a numerical indicator of a child's growth to maturity across a range of psychosocial competencies.

Typically, these include areas such as personal-social development, attention span, expressive and

receptive language, visuoperceptual skills, fine and gross motor skills, and initiative and independence, together with aspects of cognitive development, problem solving, and memory. A DQ should not be considered as a constant, but as a simplified index, reflecting changes in experience, patterns of interaction and learning over time, and summarizing the more detailed domain-specific information from which it is derived. Unlike the intelligence quotient (IQ), the DQ is a ratio statistic reflecting a child's overall development in relation to criteria logged in authentic social contexts. In contrast, the IQ is a deviation score based on statistical comparison of an individual's performance on contrived tasks under highly controlled test conditions with normative data for a given age group.

In clinical and educational work, it may be desirable to construct an accurate, fine-grained profile of a child's behavioral, communication, and intellectual development in order to inform an overall assessment of a child's learning needs, to make a diagnosis, plan an intervention program, or identify resources required. Using direct observation, play-based assessment or problem-solving tasks, a detailed developmental profile may be constructed using criteria and age reference points drawn from the research literature.

There is an extensive body of work—more detailed in early infancy—documenting the age at which most children achieve milestones in development, such as following an adult's line of gaze, crawling, reaching and grasping objects, and manipulating tools to perform tasks such as cutting or threading, as well as the appearance of speech sounds and word combinations in spoken language, moving on to more complex cognitive functions involving recall or reasoning. Age-equivalent scores for each domain may be converted to ratios or quotients, for example, to derive a social or language DQ. The simplest procedure to calculate an overall general DQ is to divide the subject's summated developmental age (DA) across domains by the chronological age (CA) and multiply by 100 ($DQ = DA/CA \times 100$).

There are special situations where a developmental profile and DQ are very useful. For example, some children diagnosed with autistic spectrum disorder (ASD) or related communication and learning difficulties present uneven profiles, idiosyncratic response patterns to social and other stimuli, or noncompliance to formal testing. In fact, diagnosis of ASD is made from a consideration of such behavioral evidence. Materials such as the Psycho-Educational Profile–Revised (PEP-R) (Schopler et al., 1990) provide a flexible, non–time constrained framework for an examiner to observe, evaluate, and record responses in order to depict a child's relative strengths in areas relevant to ASD, to plan intervention and monitor progress over time. A DQ derived from this or other informal assessment frameworks allows children's individual developmental trajectories to be plotted over time in order to probe the impact of intervention strategies and avoids some of the pitfalls of standardized intelligence testing for atypical groups. (See Webster et al., 2003, for an illustration of this research methodology.)

—Alec Webster

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DIABETES

Type I diabetes (insulin-dependent diabetes mellitus) is the most common endocrinology disorder, with onset typically occurring in adolescence. It is thought to be an autoimmune disorder that results in pancreatic beta cell destruction and the eventual loss of all insulin production. Insulin regulates blood levels of the sugar glucose and allows glucose to enter cells from the bloodstream, where it is absorbed and used as energy. Patients with type I diabetes must administer exogenous insulin daily in order to maintain normal blood glucose levels. In type II diabetes (non-insulin-dependent diabetes mellitus), insulin continues to be produced, but it is either produced in insufficient amounts to maintain normal blood glucose levels, or there is insulin resistance, and the body does not properly utilize insulin.

Approximately 5% to 10% of Americans with diabetes are diagnosed with type I diabetes, which occurs in approximately 1 in 500 to 600 children in the

United States and in the range of 0.6 to 2.5 in 1,000 children worldwide. The disease appears to occur equally in females and males, with peak onset of the disease typically around puberty, although it can be diagnosed through middle adulthood. Type I diabetes appears to occur in individuals with a genetic predisposition, accompanied by an environmental stressor. According to the American Diabetes Association (ADA), presenting symptoms at the time of diagnosis of type I diabetes include polyuria (increased urination), polydipsia (excessive or abnormal thirst), weight loss accompanied by dehydration as well as glucose levels of over 126 mg/dl (i.e., milligrams of glucose per 100 milliliters of blood) while fasting, or a random level of blood glucose over 200 mg/dl. The incidence of type II diabetes, previously considered a disorder of adulthood, has recently increased in younger children and appears related to increased rates of childhood obesity. In fact, type II diabetes currently accounts for approximately 10% to 20% of new diabetes cases in younger people. The incidence of type II diabetes is higher in African-American, Native American, and Latino populations.

In an effort to maintain near-normal blood glucose levels (between 80 and 120 mg/dl), daily blood glucose monitoring, administration of exogenous insulin, proper diet and meal planning, as well as exercise, are central to the treatment of type I diabetes. The goal of treatment is to maintain blood glucose levels close to the normal range in order to reduce the risk for complications. Blood glucose levels are measured several times daily (typically before meals and at bedtime) with a glucometer, which measures blood glucose from droplets of blood. In addition, a glycosylated hemoglobin ($HbA1_c$) test provides patients with information about their average blood glucose level over the past 2 to 3 months and should be conducted quarterly at a doctor's office. Exogenous insulin is administered two to three times per day via injections or via an insulin pump with an indwelling needle/catheter under the skin in an effort to restore glucose metabolism. Insulin doses are calculated by individuals based on their blood glucose reading from a glucometer at the time of an injection/infusion as well as based on the content of an upcoming meal. As an alternative to daily injections, the insulin pump can help maintain better metabolic control by its administration of small amounts of insulin continuously throughout the day, with larger amounts/boluses at meal times. The diet recommended by the ADA typically includes 45% to 60% of total calories from carbohydrates, 30% from fat, and 10% to 20% of calories from protein. Exercise is an important aspect of the treatment of diabetes, as it also affects blood glucose levels. For some children with type II diabetes, the disease can be managed by appropriate diet and exercise in an effort to lose weight, sometimes in conjunction with oral medications. However, children with type II diabetes frequently also require daily insulin therapy.

When abnormal blood glucose levels are detected, they must be corrected to avoid episodes of hyperglycemia (blood glucose levels in excess of 180 mg/dl), as well as episodes of hypoglycemia (blood glucose levels below 70 mg/dl). Hyperglycemia can result from excessive carbohydrate intake or an insufficient dose of insulin, and is characterized by extreme thirst and hunger, frequent urination, unusual weight loss, extreme fatigue, irritability, nausea, and sweet-smelling breath. Prolonged hyperglycemia can result in the production of ketone bodies and in severe cases can lead to diabetic ketoacidosis, a serious condition where the body has dangerously high levels of acids (i.e., ketones) that accumulate in the bloodstream. This can lead to severe dehydration, coma, or even death and typically requires hospitalization. Hypoglycemic episodes can result from a missed meal, too much insulin, or exercise and includes symptoms such as dizziness, nausea, sweating, trembling, and confusion from insufficient levels of blood glucose to maintain normal brain functioning. Hypoglycemia can result in seizures, coma, and even death if not treated.

Potential long-term complications of diabetes include nephropathy (kidney disease), neuropathy (nerve damage), cardiovascular disease (heart disease), skin and foot complications, as well as retinopathy, which can lead to blindness. These complications have been associated with longer disease duration as well as with poorer metabolic control (i.e., chronic hyperglycemia). The maintenance of near-normal glucose levels can decrease and delay the development of these complications. Children with diabetes also are at an elevated risk for various psychiatric problems, including eating disorders, depression, and anxiety. Furthermore, from a psychological perspective, type I diabetes has been associated with an increased risk for learning disabilities, particularly with an earlier age of disease onset. However, maintenance of near-normal blood glucose through treatment, including administration of appropriate amounts of insulin, proper diet, and adequate exercise, can allow patients with type I diabetes

to lead a relatively normal life and avoid these potential consequences of the disease.

—Meredith A. Fox and Clarissa S. Holmes

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DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS

The *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) is a compendium of all the known forms of psychopathology published by the American Psychiatric Association. Currently in its fourth edition, the *DSM* is utilized in both research and mental health settings for the purposes of reliably identifying psychological disorders and providing information to third-party payers.

BACKGROUND

Beginning with the third edition, the *DSM* has been organized atheoretically. That is, each disorder has a set of objectively identified symptoms that would allow diagnostic identification by clinicians with diverse theoretical backgrounds. This stands in contrast to prior editions, which were based on a psychodynamic interpretation of each diagnosis. The change to an atheoretical approach to diagnosis has allowed for greater reliability between raters who use this guide for establishing the presence of psychopathology.

USE AND APPLICATION

The DSM establishes diagnoses along five axes. These axes are as follows:

Axis I: Clinical disorders

Axis II: Personality disorders and mental retardation

Axis III: General medical conditions

Axis IV: Psychosocial environmental problems (rated with descriptive categories, such as economic problems associated with job loss)

Axis V: Global assessment of functioning (rated from 1 [persistent danger to self or others] to 100 [superior functioning in a wide range of activities])

The axis that has received the most attention has been axis I. This axis is composed of the following categories: schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, somatoform disorders, disorders usually first diagnosed in childhood, eating disorders, delirium, dementia, amnestic and other cognitive disorders, factitious disorders, dissociative disorders, sleep disorders, impulse control disorders, and adjustment disorders. These categories of disorders have enjoyed high reliability.

Recently, researchers have turned their attention to axis II, particularly the personality disorders. The personality disorders are currently classified into three broad areas, or clusters, as follows: cluster A, odd and eccentric (paranoid, schizoid, and schizotypal); cluster B, expressive/labile (antisocial, borderline, histrionic, and narcissistic); and cluster C, anxious (avoidant, dependent, and obsessive-compulsive). Placing personality disorders on a separate axis from other axis I disorders serves two functions. Principally, it serves as a guide for diagnosticians to consider whether a personality disorder is present in addition to any axis I disorders. Second, it underscores the chronic and inflexible nature of this class of disorders.

Axis III accounts for medical conditions that may influence treatment outcome or for which psychological factors may play a role in their ongoing presence. For example, the absence of menstruation may have implications for the diagnosis and treatment of an eating disorder.

Axis IV accounts for environmental problems. This may represent areas that can limit the effectiveness of treatment for disorders on the previous three axes. For example, treatment of an anxiety disorder would be

complicated in an individual who has recently lost his or her job and suffers economic stress in addition to the presenting disorder.

Axis V presents a global numerical assessment intended to represent the overall functioning level of the client or patient. In typical use, this axis is rated for the functioning level at the time of diagnosis, as well as for the highest level estimated for the year prior to evaluative contact.

IMPORTANCE

The DSM represents, in a single detailed document, a way for the diversity of mental health providers and researchers to communicate with one another regarding the nature of various psychological problems. Moreover, the atheoretical approach to diagnosis circumvents barriers to communication among mental health professionals who have varied theoretical backgrounds.

—Dean McKay and Steven D. Tsao

See also Developmental Psychopathology

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DIALECTICAL THOUGHT

Dialectical thought involves seeking a synthesis of two or more seemingly opposing viewpoints. Throughout our lives, our views about how the world works change. New ideas can be learned through experiences with the world or through interpersonal interaction. As a person's views on a topic, behavior, or experiences begin to conflict with one another, that person may become motivated to resolve the conflict. Conflicts may be resolved by logically deciding in favor of one of the competing viewpoints—an analytic style of solution. However, they may also be resolved by seeking synthesis of the two competing viewpoints—a dialectical style of solution.

Consideration of dialectical thinking can be traced back to the philosophies of Georg Hegel and Karl Marx. In psychology, Klaus F. Riegel and Michael Basseches both proposed influential frameworks for understanding the development of dialectical thinking. Riegel, for example, proposed that development depended on conflicts that occur throughout life. In his view, development never ends. As people grow older, they tend to adopt a dialectical thinking style in which people seek to live with contradictions and accept that it is impossible to escape them.

Jean Piaget's influential theory of cognitive development proposed that children go through several unique stages, ultimately resulting in the formal operations stage. In the formal operations stage, a new kind of thought develops based on logic and consistency. However, there have been challenges to the belief that formal operations necessarily reflect the highest stage of thinking and that cognitive development plateaus prior to adulthood. Some recent challenges come from cultural psychologists, who have argued that analytic thinking (or formal operation–based thinking) is prototypical of Western thinking, while dialectical thinking is more prototypical of highly developed Eastern thinking. Both the analytic and dialectical styles of thinking are eventually learned in most cultures, but the emphasis on one or the other varies considerably. Which develops earlier depends on cultural values and parenting practices. Within a culture, development of reasoning styles is often thought to depend on interactions with peers.

The most relevant work in developmental psychology is on epistemic reasoning, a term used to describe peoples' beliefs about what constitutes a valid argument and their general approach to structuring arguments. Recent developments in this line of thinking have explored how people in American society gradually adopt more dialectical reasoning styles for dealing with problems that have no clear answer (called

ill-structured problems), such as whether life or liberty is a more valuable ideal. Jan D. Sinnott, for example, believes that older adults tend to move toward a style that simultaneously embraces multiple thought systems while accepting that we are always limited in our knowing. Similarly, Patricia M. King and Karen S. Kitchener have outlined how young adults move from a reasoning style that involves conflicting ideas being judged quickly as either true or false to one in which people explore conflicting viewpoints and view ideas as relatively more likely or less likely based on the evidence. In each case, dialectical thinking emerges as people consider multiple possibilities and admit that there is no way to be absolutely certain in uncertain situations.

Currently, most mainstream cognitive psychologists find it difficult to accept the research on dialectical (or postformal) thinking because it often is not backed up by clear experimental results. Most of the frameworks are based on interviews or observation and cannot easily be confirmed using more traditional research techniques. However, recent developments tend to be based on experiments, so perhaps the field is moving toward broader acceptance of dialectical thinking.

—Peter F. Delaney

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DIETING

Dieting is the purposeful restriction of food intake as a means of losing weight, experiencing health benefits, and/or avoiding medical complications associated with excessive weight. Dieting is typically characterized by restrictive eating, where certain foods are limited or avoided entirely. Most diet plans are based on reducing any of the body's macronutrients, such as fats, carbohydrates, or proteins, which are vital sources of energy.

WHAT IS DIETING?

Dieting refers to many diverse methods for inducing weight loss, such as controlled eating, fasting, and consuming diet aids. The prevalence of dieting has steadily increased over the past 40 years, since an increasing proportion of the population is overweight. The World Health Organization (WHO) has defined overweight as having a body mass index (BMI) of 25 to 29.9 kg/m^2. Obesity is defined as having a BMI greater than 30 kg/m^2. Reports estimate that 61% of adult Americans are either overweight or obese. Furthermore, the detrimental effects of being severely overweight are becoming increasingly clear. Overweight individuals have an increased risk for high blood pressure, cardiovascular disease, stroke, type II diabetes, cancer, and other complications (e.g., sleep apnea, gallbladder disease). Medical complications related to obesity are estimated to cost the United States approximately $99 billion per year. In response to these health concerns and further cultural pressures, the percentage of men and women dieting has increased from 7% and 14% in 1950 to 24% and 40% in 1993, respectively. Not only has there been a marked increase in dieting among adults, but adolescent dieting is on the rise as well. Reports from the United Kingdom estimate that 35% to 60% of girls 11 to 18 years of age are currently dieting.

THE NEED FOR DIETS

Many of the health risks associated with being overweight can be minimized by reducing 5% to 10% of overall weight. Successful diets can actually increase the body's metabolism through the consumption of smaller meals with greater frequency throughout the day. For example, instead of adhering to a traditional eating schedule of three meals a day, dieters that adhere to an eating schedule of five to six smaller meals stimulate the body's metabolism. The body's metabolism is spurred into action with each food source ingested, as the body must break down the necessary nutrients. Healthy, balanced diets can also increase energy levels

by omitting sugary and highly processed foods, which rapidly elevate and then drastically decrease blood glucose levels, affecting mood and energy levels. By consuming foods rich in fiber and proteins, blood glucose and energy levels can be maintained at a steadfast level, omitting drastic spikes in glucose levels. Healthy diet plans incorporate foods high in fiber and protein to help slow down digestion and keep glucose levels from rising or falling too rapidly.

The psychological benefits of a successful diet plan can be just as empowering as the physical benefits. As dieters lose weight and improve their health, well-being, and physique, they gain confidence in themselves and experience heightened self-esteem and body satisfaction. Successful dieters report increased life satisfaction and emotional well-being as a result of their weight loss and improved health.

THE IMPORTANCE OF PROPER NUTRITION

Obtaining proper nutrients is essential for growth, reproduction, and maintenance of good health. Nutrients supplied through food sources provide support for all life activities in the cells of all organisms. Nutrients are labeled as carbohydrates, proteins, fats, vitamins, minerals, and water. Our bodies rely on these nutrients for building and repairing tissue, maintaining heart rate and pulse, and providing sufficient body heat. Without adequate nutrition, the body becomes frail and less apt to fight infection. The brain exhibits delayed reactions, the heart ceases to function properly, and in cases of extreme deprivation, death is possible.

THE DIETING DILEMMA

The dieter must distinguish between the nutrients essential for proper bodily functioning and excessive calories that are counterproductive to weight loss.

Successful dieters must learn to correctly identify the body's needs and the satisfaction of these needs. The boundary between hunger and satiation is referred to as the diet boundary. This distinction, the diet boundary, is complicated by the fact that people frequently eat for other reasons than the body's need for nutrients. For example, people may eat to escape boredom, to cope with stress, or as a means of social interaction. Hence, dieters face a dilemma of maintaining an adequate diet boundary as they are immersed in a social world, surrounded by an array of circumstances and food choices. In the midst of these situations, dieters must determine when to eat, how much to eat, and what types of food are appropriate.

HOW DIETS WORK

It is ultimately the amount of calories consumed per day that determines the amount of weight lost or gained. The body burns calories as fuel for basic bodily functions. Weight loss occurs when fewer calories are consumed (e.g., dieting) or when more calories are burned (e.g., physical activity). Creating a caloric deficit of 500 calories per day (e.g., via dieting or physical activity) results in weight loss of approximately 1 pound per week. The optimal amount of weight loss per week is 1 to 2 pounds. Amounts exceeding the optimal amount can cause muscle to be burned rather than fat.

RESTRAINT AND DISINHIBITION

One of the hallmarks of dieting is restrictive food intake. As dieters attempt to lose weight, they limit the types and amounts of foods consumed. These rigid periods of restraint can be physically and psychologically draining, as dieters must change the way they eat. This change often results in dieters neglecting the foods they enjoy for the foods on the diet. As a result of these intense periods of restrictive eating, dieters often exhibit the opposite extreme of restraint: disinhibition or overindulgence. These bouts of overeating, also referred to as disinhibited or binge eating, usually occur when dieters exceed their diet boundary.

There are both physiological and psychological factors that perpetuate this restraint-disinhibition connection. Successful diets yield weight loss, which can cause a state of chronic hunger. When body weight drops below a certain set point, the body attempts to physiologically defend the appropriate weight. Intense hunger pains and chronic hunger ensue to cue the individual that more food is required. Binge eating succeeding restrictive eating can also occur as a result of the reduced amounts of fat in most diets. Because fat causes feelings of satiation and fullness, reduced fat intake may increase hunger.

These physiological responses to dieting are amplified by psychological responses to restrictive food intake. As dieters alter their current eating patterns, feelings of perceived deprivation and preoccupation with food frequently occur. Perceived deprivation is caused by dieters eating less than usual, less than

desired, or less of the foods they enjoy, rather than by an actual calorie deficiency. Preoccupation with food is defined as the amount of time spent thinking about food. As food, eating, and weight begin to dominate the dieter's thoughts, the dieter becomes more likely to consume larger portions of his or her favorite foods. This preoccupation with food often leads to the dichotomous thinking of foods in terms of "good" and "bad." Dichotomous thinking is frequently seen in anorexic patients. As their disease progresses, more foods are labeled "bad" and are restricted.

TYPES OF DIETS

There are currently many diverse types of diet plans available. Diets vary extensively in calorie intake, type of food restriction, flexibility, duration, and manageability. The key to diet selection is making an educated, well-informed decision. Some diets are simply not physiologically sound and may impose health threats that supersede weight loss. For example, many people either restrict calories or stop eating altogether to lose weight. When the body receives cues that food is scarce (i.e., limited food intake), the body attempts to prepare for periods of limited food. The body's metabolism slows down to avoid demanding more food when none is available. The effect of this slowed metabolism on the modern dieter is the opposite of the intended purpose. That is, the dieter experiences rapid weight gain once normal eating patterns ensue.

Some diets substitute one or more meals with a meal replacement shake or bar. The aim of meal replacement or formula diets is to provide the dieter with necessary nutrients while minimizing excessive calories. There are two central advantages to formula diets: they are easy to follow and they reduce the decision-making process. There are also several disadvantages to formula diets: they are monotonous and the dieter does not learn to make healthy food choices. Furthermore, formula diets that are extremely restrictive (e.g., 300 calories per day) can be detrimental to health.

Different diets emphasize varying aspects of nutrition. For example, high-protein diets stress the importance of the amino acids contained in protein and avoid carbohydrates. High-protein diets usually cause rapid initial weight loss because of the reduction in carbohydrates, which causes water loss. High-protein diets generally do not count calories and are often high in saturated fat. These diets may produce dangerous effects on the body because of the fat content and the excessive amounts of uric acid released.

On the other end of the dieting spectrum are high-carbohydrate, high-fiber diets. High-carbohydrate diets stress the importance of nutrients contained in vegetables, fruits, nuts, and whole grains. High-carbohydrate diets may assist the dieter's feeling of satiation due to the high-fiber content. High-carbohydrate diets exhibit slower weight loss over an extended period of time. These diets can be dangerous if the calories are too low or if the protein or fat intake is insufficient to fulfill nutritional needs.

Yet other diets advocate food combinations to promote weight loss. These diets generally do not count calories and are structured around combining different food sources. Food combination diets vary in terms of the nutrients obtained and the well-roundedness of the food selections. Some of these diets (e.g., the Beverly Hills Diet, Jane Fonda, Bloomingdale's Eat to Succeed) can cause vitamin and mineral deficiencies. Dieters should search for well-balanced diets containing adequate protein, vitamin, and mineral sources.

In opposition to the food combination diets are the food segregation diets that separate different types of food sources. For example, Suzanne Somer's *Get Skinnier on Fabulous Food* advocates separating protein and carbohydrate sources. This diet is based on the assumption that when protein and carbohydrates are consumed at the same time, their enzymes cancel each other out, creating a halt in digestion and causing weight gain. However, there is no scientific research to support this claim. Furthermore, the high-fat content may put dieters at risk for heart disease or high cholesterol.

The most successful diets promote lifestyle changes involving both eating and exercise behaviors. A healthy diet should consist of moderate-sized portions of a wide variety of foods to ensure that proper nutrients are obtained. Dieters should avoid diets promising a "quick fix" to weight problems or other solutions that seem too good to be true. Dieters should instead seek out well-rounded diet plans that promote gradual, long-term weight loss and advocate lifestyle changes.

—Kathryn J. King

See also BMI (Body Mass Index), Eating Disorders

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DISASTERS

Natural and technological disasters are exceedingly stressful events that disrupt communities and families and traumatize individuals. Natural disasters are events beyond the control of human technology such as earthquakes, hurricanes, and tornadoes. Technological disasters include events such as explosions, floods due to dams breaking, industrial accidents, and nuclear power plant failures. Both natural and technological disasters can create health and psychological problems due to death, injury, property loss, economic changes, and loss of shelter, food, and water supplies. Although the immediate safety of people is paramount, government and public health authorities give insufficient attention to the later psychological effects. Both types of disasters are associated with increased psychological morbidity, especially in those with preexisting conditions or susceptibility. Alcohol and other drug abuse often rises after a disaster, especially in men. Children sometimes show regression in their developmental skills such as toileting, dressing, and speech. Older children and adolescents usually experience longer-lasting effects of disasters than younger children.

Technological disasters pose slightly different problems than natural disasters. Community cohesion can increase as a result of a natural disaster, but technological disasters often divide communities due to uncertainties in blame, community connections to the source of the disaster, the injustices of the event, the stress of seeking government or corporate remedy, loss of trust in the government and public agencies, and the uncertain extent of long-term harm due to exposure to toxic substances. Examples of technological disasters are the toxic wastes at Love Canal, New York; nuclear reactor accidents at Three Mile Island, Pennsylvania, and Chernobyl, Ukraine; and the explosions of chemical plants in Seveso, Italy, and Bhopal, India.

Leaking toxic wastes at Love Canal created a crisis in 1978 that involved an elevated rate of miscarriages, lower child growth rates, and high stress due to failure of government and corporate officials to cope with waste. Many residents demanded relocation and compensation for health and property. Lawsuits were resolved only after approximately 15 years. As a result of Love Canal, the U.S. Congress passed the "Superfund" law that taxed companies in order to create a fund for cleaning up landfills.

The first proper epidemiological studies of the psychological effects of a technological disaster were conducted after the 1979 Three Mile Island nuclear reactor accident. Follow-up studies 5 years or longer after the accident found that Three Mile Island residents who evacuated had higher levels of blood pressure, stress hormones, disturbed sleep, depression, and intrusive thoughts compared with samples from other areas matched for socioeconomic status. Mothers who had preschool children at the time of the accident were especially susceptible to adverse psychological effects. Risk perceptions of the damaged plant were positively related to negative psychological effects. As of 2005, there are still scientific debates about the physical health effects of the radiation released during the accident. However, there is agreement that the accident created long-lasting negative psychological effects. The same is true of the accident at Chernobyl, Ukraine. The

psychological effects of the chemical plant disasters in Seveso and Bhopal were not studied.

—*Colleen F. Moore*

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DISCIPLINE

The term *discipline* is used variously in the literature. The more restrictive view of discipline is to define it as consequences for child misbehavior (e.g., using time out, spanking, removing privileges). The more comprehensive view of discipline, the view elaborated here, defines it as behaviors aimed at helping children learn how to behave. In this vein, discipline includes providing positive motivators for desired behavior as well as punishing child misbehavior.

TYPES OF DISCIPLINE

Positive forms of discipline, those forms aimed at increasing the frequency of desired behaviors, include attention, praise, privileges, and concrete rewards (e.g., stickers, tokens, money). Punishment, which is aimed at decreasing the frequency of unwanted child behaviors, is frequently divided into categories of physical punishment and nonphysical punishment. Physical punishment involves inflicting physical pain or discomfort. The most common form of physical punishment used by parents is spanking, but other forms of hitting (e.g., slap on the wrist) are also considered physical punishment. Nonphysical punishment includes behaviors such as removing attention, privileges, or child possessions; isolating a child for a period of time as in time out; scolding; shaming; or asking a child to perform a task that he or she regards as difficult or undesirable such as chores.

In the late 1960s, Diana Baumrind proposed three major approaches to child discipline in Western culture. She proposed the term *authoritative* to describe discipline that combines high levels of emotional support with limit setting, requests for child cooperation, reasoning, and monitoring of child behavior. The term *authoritarian* refers to discipline that is low in emotional support and high in control and punishment. A *permissive* approach to discipline includes high levels of emotional support but relatively few limits set on the child's behavior.

EFFECTIVE HOME DISCIPLINE

Since the late 1960s, research has demonstrated the relative effectiveness of particular parental discipline strategies and the relative ineffectiveness of other strategies.

Effective parental discipline strategies include the use of clear rules and commands, time out, brief withdrawal of privileges, consistency in implementation of discipline behaviors, and immediate reinforcement (e.g., praise, reward) of appropriate child behavior. Parents should be sure that the child is capable of performing behaviors that he or she is asked to do. When one delivers punishment, he or she should remain as unemotional as possible so as to not give additional attention to the child's misbehavior.

Parental discipline behaviors that have been found to be relatively ineffective include use of unclear rules and commands, attention for inappropriate behavior, laxness (i.e., failure to follow through on planned consequences for child misbehavior), and use of harsh physical punishment. Discipline is also less effective when there is a long delay between child misbehavior and parental discipline and when the parent gives many warnings to the child before giving the child a consequence for misbehavior.

Studies have found that the effectiveness of specific discipline strategies varies to some extent depending on the child's age. For example, time out is most effective from ages 2 to 9 years. Removal of privileges is more effective for children 4 to 17 years of age than for children younger than 4 years. Reasoning (i.e., negotiation regarding rules and consequences for child misbehavior) is more effective with adolescents than younger children.

EFFECTIVE SCHOOL DISCIPLINE

The literature regarding effective discipline for children in school settings parallels that of effective home discipline. It is recommended that teachers post

rules clearly in the classroom to remind children of appropriate and inappropriate behavior. Effective discipline strategies for the classroom include structured reward programs aimed at increasing children's appropriate behavior (e.g., remaining seated, completing seat work, raising a hand when one wishes to speak), time out, and loss of privilege. Response-cost programs, which combine reward for appropriate behavior and punishment for inappropriate behavior, have also been found to be effective. In a response-cost program, a child is given points for appropriate behaviors and loses points for inappropriate behaviors; accrued points can be exchanged for desired rewards such as computer time or attractive school supplies. When one is considering the implementation of a discipline program in the classroom, one must consider issues of teacher acceptability of various discipline strategies. Research has found that teachers most often favor discipline programs that reward appropriate child behavior rather than punish inappropriate behavior. Additionally, teachers may prefer discipline programs that include every child in the classroom over programs that focus attention solely on one child's behavior.

CROSS-CULTURAL ISSUES IN DISCIPLINE

Studies have attempted to determine possible variability in the effectiveness of discipline behaviors as a function of family cultural background. Some studies suggest, for example, that an authoritarian discipline style may be more effective in African-American, Latino, and Asian-American families than in European-American families. As another example, extensive verbalization while disciplining children may be a more effective discipline strategy for Chinese-American parents than for European-American families because extensive verbalization during discipline is congruent with a more general Chinese philosophy regarding the importance of educating children why particular behaviors are appropriate or inappropriate. At this time, the cross-cultural literature regarding discipline is limited.

LEGAL ISSUES REGARDING USE OF PHYSICAL PUNISHMENT

The use of physical punishment, or corporal punishment, is controversial in the United States. The U.S. Supreme Court ruled in 1977 that physical punishment in schools violated neither children's due process rights nor their rights to protection from cruel and unusual punishment (Ingraham v. Wright, 430 US 651). Although there is no federal law banning the use of physical punishment in public schools, 28 states have passed such laws.

A panel convened by the American Academy of Pediatrics in 1996 recommended against the use of physical punishment for children under age 2 years and also stated that there is more evidence of long-term negative effects from physical punishment than evidence of short- or long-term positive effects. Arguments discussed in the literature against the use of physical punishment in disciplining children include the following: (1) there is a lack of evidence that physical punishment is as effective as nonphysical forms of punishment; (2) the use of physical discipline is associated with increased rates of behavioral and emotional difficulties in childhood and adulthood; (3) the use of physical punishment teaches that violence and force are acceptable means of interpersonal communication; and (4) physical child abuse may result from unintended escalation of use of physical force while administering physical punishment for child misbehavior.

There is a small body of literature that suggests, however, that use of physical punishment may not always lead to negative child outcomes. For example, studies suggest that mild spanking, delivered calmly, may lead to a decrease in preschool children's misbehavior, particularly when the spanking is combined with other methods of child discipline such as time out.

In the United States, the use of physical punishment in the context of parental discipline is legal in every state. Approximately 60% of American families with children under the age of 18 use physical punishment as a means of discipline. Within this group, there is considerable variability in the frequency and severity of physical punishment used. Moreover, there is substantial evidence that some parents use physical punishment in combination with many other types of discipline, whereas other parents rely predominantly on physical punishment to attempt to control their child's behavior.

A substantial body of literature has attempted to identify parents who are most likely to use physical punishment as a means of child behavior management. Robust predictors of use of physical punishment include parental frustration, parental depressive symptoms, stress, negative perceptions of the parenting role, negative perceptions of the child, hostile attributions regarding child misbehavior, younger parent age,

single parenthood, and child aggressive behavior. Studies regarding the relationships between parental use of physical punishment and race, ethnicity, socioeconomic status, education, child gender, parent gender, and religious beliefs show mixed findings.

OUTCOMES OF INEFFECTIVE DISCIPLINE

The research and theoretical literature regarding discipline have identified broadly two problematic parental discipline styles: harshness and laxness. Harshness is defined as the parent responding to child misbehavior with yelling, belittling, or use of physical punishment delivered in the context of high levels of emotionality. As defined above, laxness is the failure of the adult to follow through on planned consequences for child misbehavior (e.g., threatening a consequence for child misbehavior without following through on the consequence).

Harshness has been found to be associated with anxiety symptoms, oppositional behavior, defiant behavior, juvenile delinquency, and aggression in children and adolescents. Harsh discipline experienced in childhood has also been found to be associated with depression and substance abuse in adulthood. Punishment that is given noncontingent on the child's behavior (i.e., the parent "disciplines" the child although the child has not engaged in any misbehavior) may lead to feelings of helplessness. Children may also become insensitive to punishment if punishment is increasingly coercive over time.

Lax discipline has been found to be associated with child noncompliance and antisocial behaviors.

CLINICAL IMPLICATIONS

Studies that identify parents who are most likely to use frequently excessive physical punishment and other forms of harsh discipline may be helpful in developing early intervention and prevention programs. Helping parents to cope with stress, frustration regarding child behavior, and depression may decrease the chance of parents using harsh discipline. Promotion of self-monitoring of negative thoughts and feelings may help parents to choose less punitive methods of discipline when faced with child misbehavior. Studies suggest that interventions aimed at changing parents' attitudes regarding the effectiveness of physical punishment may also be helpful. It is important to note that only half of parents indicate that they have enough information about effective discipline strategies; thus, many parents may benefit from information about effective, nonharmful methods of child behavior management.

—Andrea A. Zevenbergen

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DISGUST

Disgust has been described as an evolutionarily important emotion. According to Darwin, the function of disgust is to prevent orally ingesting contaminants or other biologically harmful substances. There are characteristic reactions associated with disgust, including physical (such as nausea), psychophysiological (muscle tension around the nose and mouth, reduction of vascular tension), and behavioral (typically avoidance). Overall, the description offered by Darwin, and the associated reactions described here, are straightforward and unidimensional.

While Darwin's conceptualization may have been unidimensional, recent research has shown that disgust is multifaceted. According to contemporary disgust theory, there are eight broad areas of disgust elicitors, or stimuli, that provoke disgust reactions:

1. *Food*: Culturally unacceptable foods, or unacceptable combinations, provoke disgust. An example would be ice cream on chicken.
2. *Animals*: Contact with food by an animal, particularly one associated with unclean places. For example, a spider walking across a cookie.
3. *Death*: Stimuli associated with death, such as cemeteries, cremation urns, or coffins.
4. *Sex*: Any culturally unacceptable sexual practices can lead to disgust reactions.
5. *Body Products*: Feces, urine, or mucus are examples of body products that can lead to disgust reactions.
6. *Body Envelope Violations*: Images of or actual exposure to internal organs or viscera.
7. *Sympathetic Magic*: This occurs when an otherwise neutral object comes in contact with an item associated with an item for consumption. For example, a label that says "saliva" placed on a cup that is known to contain spring water.
8. *Moral*: Any contact with items associated with immorality or individuals deemed immoral.

DEVELOPMENT OF DISGUST

According to recent conceptualizations, disgust develops largely through a process called evaluative conditioning. This is promoted through two major routes. One is via instructional learning such as through caregivers, who identify items as disgusting (i.e., "yucky") while making characteristic facial expressions for disgust when teaching young children about the environment. This is typically in reference to items that should not be eaten or put in the mouth.

Broadly speaking, disgust reactions to different stimuli may develop after childhood, often for items associated with previously established disgust-provoking stimuli or by labeling those items as such. For example, there is nothing about a sweater that is disgusting. However, if one were informed that it was cleaned but previously was covered with maggots, there would be a reluctance to wear that sweater because of the label and associated image bestowed on it.

ASSESSING DISGUST

Currently, there are a few ways of evaluating disgust reactions. One way is via a self-report measure. A few major instruments exist for evaluating disgust, with sound psychometric properties. Another effective approach involves assessment of muscle tension around the nostrils or upper lip. Each of these areas typically grows tighter when exposed to items that evoke disgust reactions. Blood pressure is an assessment that is being validated in some laboratories for evaluating disgust reactions. Items that provoke disgust should lead to lower blood pressure.

CONTEMPORARY APPLICATIONS OF DISGUST RESEARCH

A great deal of recent work has concentrated on the role of disgust in different forms of psychopathology. Most notably, there is increased evidence that disgust is implicated in many specific phobias, particularly blood-injury-injection, spider, snake, and other small animal phobias. Some data also suggest that disgust plays a role in contamination fear associated with obsessive-compulsive disorder. This is an active area of new developments in psychology.

—Dean McKay

See also Obsessive-Compulsive Disorder, Phobias

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DISTANCE LEARNING

Distance learning occurs when instructors and learners are separated by space and possibly time. Distance learning is part of a system of learning, teaching, communication, design, and management. The learning is interactive and may happen synchronously with instruction or asynchronously. The interaction among instructors, learners, and information is mediated by one or more technologies.

Synonyms and similar terms for distance learning include cyberschooling, distance education, distributed learning, e-learning, m-learning, online learning, open schooling, remote education, telelearning, and virtual schooling. The growth in interest in distance learning stems from the benefits it affords, such as convenience in location of learning, flexibility in scheduling learning, effectiveness for learning given the proper conditions, a multisensory interactive approach, and efficiency in use of time and resources. Distance learning applications for adult learners include professional development, continuing formal education, needs-based instruction, mentoring, and personal enrichment.

Most distance learning students learn effectively, and online courses and programs can be just as effective as face-to-face experiences. Successful distance learning requires that both students and instructors use different skills than they would use in a traditional teaching and learning environment because of the unique characteristics of the distance learning situation.

TRANSACTIONAL DISTANCE

The distance between learner and teacher as stated by Michael Moore "is not merely geographic, but educational and psychological as well. It is a distance in the relationship of the two partners in the educational enterprise." In general, novice students need more structure, and as they acquire skill, knowledge, and expertise, their need for dialogue increases and the distance between educators and students decreases no matter their physical distance.

The communication transaction between educators and students varies depending on the background of students, their prior knowledge of a subject, and their motivation and readiness to engage in learning, as well as the nature of the subject matter, the complexity of the discipline, and the breadth and depth of the curriculum. Transactional distance changes not only during the course of a term, but in each session.

Table 1 Types of Interactive Distance Learning

Synchronous	*Asynchronous*
Audioconference	Web site
Videoconference	Fax
Chat	Threaded discussion
Live whiteboard	E-mail
Telephone	Mail for print or recorded media
Multiuser domains (MUDs)	Broadcast audio or video

EFFECTIVE DISTANCE EDUCATION

Distance education and its technologies require extensive planning and preparation. Teachers must be proficient in the use of communication technology and in the techniques proven effective in the distance education environment. Media must be appropriate to the technology and to the needs and abilities of the students. The distance educator has the role of a guide or moderator more than that of a presenter or performer. Skills in communication are considered to be more important than content knowledge, because interaction of students is the factor that contributes most to learner success in distance education.

Distant students bring basic characteristics to their learning experiences, which influence their success in learning. Success as a distance learner depends on factors such as having the necessary skills for learning and communication, adapting to the technology-mediated social setting, engaging the learner in relevant activities, and having the appropriate technical skills and resources, according to Greg Kearsley.

The quality of distance learning courses or modules depends on content, pedagogy, motivation, feedback, organization, usability, assistance, assessment, and flexibility. The process of developing and implementing effective distance education happens in an iterative cycle proposed by Cathy Cavanaugh involving

resources–practices–results. Broadly considered, the three stages in the cycle are:

1. Procurement and preparation of the resources necessary to meet the distance education goals
2. Delivery of instruction using the best practices from education, business, and research
3. Analysis of the results of distance education to gauge achievement of the goals

—*Cathy Cavanaugh*

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DIVORCE

Divorce, or the legal dissolution of marriage, is a common occurrence that affects millions of individuals and families throughout the world. The divorce rate in the United States and in much of the Western world is higher than it has ever been. Current estimates in the United States suggest that 50% to 67% of first marriages will end in divorce within 40 years, and the figure is even higher for second marriages. The United States leads the world in the incidence of divorce and in the proportion of children affected by it. In each year since 1970, more than 1 million children are affected by divorce. As of 1994, 4.7 million children lived with a never-married parent, 5.9 million lived with a divorced parent, and 4.8 million lived with a separated or widowed parent. By the year 2000, 25% of people between the ages of 18 and 44 had divorced parents.

It is worth noting, however, that accurate divorce statistics are difficult to determine. Several states (California, Colorado, Indiana, and Louisiana) do not even keep track of the number of divorces granted each year, so statistics are always estimates based on available data. Furthermore, statistics are always based only on legal marriages and do not include dissolution rates of unions in which couples do not legally marry in the first place.

HISTORY

Until the late 19th century, divorce was relatively uncommon in the United States. Most marital disruptions occurred as a result of informal separation or desertion, and the majority of marriages lasted until the death of one partner, an event that typically occurred much earlier than it does today. Divorce rates in this country began to rise shortly after the Civil War and continued on a steadily upward course for over 100 years. In 1867, roughly 5% of marriages ended in divorce. By 1964 the divorce rate for first marriages was 36%. There was a sharp increase in the incidence of divorce from the mid-1960s to the late 1970s, a period sometimes referred to as "the divorce revolution." In 1965, there were 2.5 divorces per 1,000 population. That rate had increased to 3.5 per 1,000 by 1970 and 4.8 per 1,000 by 1975.

Blaine Fowers, in a recent book examining attitudes and expectations of marriage, suggests that the dramatic increase in the divorce rate in the past 150 years has coincided with changes in our society's views of marriage. He points out that prior to 1850, "expectations for what we call *emotional fulfillment* had little to do with whether couples entered into marriage or terminated the union. . . . Contrary to our modern assumption that marriages are made and maintained by love, spouses at this time did not necessarily expect their marriages to be emotionally gratifying so much as to enable them to have an orderly, virtuous life" (pp. 64–65). He further posits that as expectations that marriage should be based on love and should provide emotional fulfillment have risen, the chances that one will feel disappointed in a relationship have also risen. The rising divorce rate in the past century reflects this shift in values.

The women's movement and other sociopolitical changes of the past 35 years have also contributed to changes in our culture's views of marriage, parenting, divorce, and custody. Prior to 1970, most state laws defined marriage in a hierarchical manner favoring the husband. Basically, a married woman's legal identity was submerged in her husband's. Women were typically required to assume the husband's name, domicile (permanent state residence), and credit rating. Matters such as obtaining a credit card, taking title to a marital home, or registering to vote could not be accomplished unless husband and wife shared the same last name. Until the mid-19th century and the passage of the Married Woman's Property Acts, all of a woman's assets and property became her husband's upon marriage. Even laws regarding sexual assault reflected the view that the woman herself was the property of her husband, and in most states a married woman could not be raped by her husband because her body belonged to him.

Changes began to occur in the 1960s, including the first "no-fault" divorce laws. Up until the introduction of these laws, divorce was based on an adversarial model in which divorce could not legally be consensual. One party had to show that he or she was not at fault and had not contributed to the "wrong" and that the other party had done something so heinous (typically cruelty or adultery) that it destroyed the marriage. If the grounds were not proven, divorce was not granted. Because of the strict requirements for cruelty or adultery, grounds were often difficult to prove unless there was de facto cooperation from the defendant. Until 1967, the only legal ground for divorce in New York State, for example, was adultery.

Fault-based divorce influenced not only the means by which one could obtain a divorce, but the assignment of property and decisions about the care and custody of children. It was hard to separate evidence for proving grounds for divorce from litigation over custody, alimony, and child support. For example, a Florida statute used to deny alimony to a woman who was proven to have committed adultery.

In 1969, California became the first state to implement a divorce law without any fault-based grounds for divorce. While only a few states have entirely eliminated fault as a basis for divorce, all 50 states have enacted some mechanism for couples to go through an uncontested divorce without assigning blame to one or the other spouse. There is some disagreement in the field about the effects that no-fault divorce have had both on the divorce rate and on the economics of divorce for families and children. Although the divorce rate was rising during the years that no-fault divorce laws were first enacted (1970 to 1976), they have not continued to rise since that time. Many researchers conclude that fault laws were ineffectual and were not fully enforced for many years before the advent of no-fault laws so that the change in law has been a minor factor in the fluctuation of divorce rates themselves. There is less agreement as to the economic effects of no-fault laws. Many researchers believe that divorce has a negative economic effect on women and children. This is due to the fact that women still earn, on average, only 70% of what men earn, and that most divorces still result in mothers caring for minor children. Other researchers point out that divorce negatively affects both men's and women's economic status since maintaining two homes is more expensive than managing one.

TYPICAL DIVORCE CHRONOLOGY

There are two major methods for obtaining a divorce: doing it yourselves, usually with the help of a manual or divorce kit, and hiring attorneys to help you litigate your divorce. For couples with no children, few assets, and who are basically in agreement about wanting the divorce, the divorce itself is mainly a matter of completing the appropriate paperwork for their state. These couples may choose to negotiate their settlement and file their own papers. Most people use a manual or divorce kit to help them through this process. Since divorce laws vary by state, you must obtain a book or kit with the forms and procedures that will be required for the state in which you reside at the time of the divorce. Of course, having children and assets does not bar you from handling your own divorce, but it does make the process more difficult and complicated. It requires a great deal more negotiation than a simpler situation, but it is also less costly than a contested divorce would be.

Most couples who can do so choose to hire attorneys to handle the divorce proceedings for them. This better ensures that both parties fully understand their rights and obligations during the divorce process.

Although the precise manner in which a divorce proceeds varies from one location to another, most contested divorces follow the following course: One spouse gets a lawyer, who writes up a petition or complaint. The complaint is a legal document that outlines

the reasons for the divorce and how the complainant wants to settle financial and custody issues. The petition is then filed with the court. The court ensures that the petition or complaint is served on the other spouse and also serves a summons that requires a response.

The spouse who has not initiated the process must answer the complaint, usually with the assistance of his or her own attorney. The answer outlines the manner in which this partner wants to settle financial and other legal issues. If the served spouse does not answer the petition, the court usually assumes that he or she agrees to its terms. The couple then exchanges information about property and income in order to decide how to divide up property and how to manage child support, custody, and alimony. Sometimes the couple can voluntarily resolve all these issues through mediation.

Mediation is the use of a neutral third party who has been specifically trained to help adversaries work out a compromise on issues of disagreement. Mediators often have backgrounds in counseling, law, or financial planning, but they typically receive additional training in doing divorce mediation. The work of a mediator, unlike that of the divorce attorney, is to work on the side of compromise and/or for the best interests of any children involved rather than in the interests of one or the other divorcing partner.

Once a settlement is reached, the agreement is shown to a judge at an informal hearing. The judge will determine whether both parties understand the agreement and voluntarily signed it. If this is the case, and the judge approves the agreement, the couple will be granted a divorce decree that documents the issues to which they agreed. If the judge does not approve it, or if the couple cannot reach an agreement, the case will go to trial.

At trial, the attorneys present evidence and arguments for each side, and the judge decides the unresolved issues, including child custody, visitation, child and spousal support, and property division. Once these issues are decided, the judge grants the divorce. Either or both parties may appeal the judge's decision to a higher court, but it is unusual for appeals courts to overturn a judge's decision.

CUSTODY

There are a number of considerations that divorcing couples and the courts must make regarding the future care of children (and in some instances, animals or pets) after a marital dissolution. Legal custody of a child is the right and obligation to make decisions about children's upbringing such as where they will live, what school they will attend, medical decisions, and the like. Physical custody is the right of a parent to have the children live with him or her. Joint custody or shared custody refers to a situation in which both parents share legal and/or physical custody of their children. If parents share physical custody, it means that the child spends a significant portion of time with each parent. Parents who share physical custody almost always share legal custody, but not necessarily the other way around. Sole custody means that only one parent, who is referred to as the custodial parent, has the right to make major decisions regarding the child's upbringing and also that the child lives with him or her. Usually the noncustodial parent has visitation rights, meaning that he or she is permitted to spend time with the child, but not to have the child living in his or her home. In most states, courts are moving away from awarding sole custody to one parent and are increasingly enlarging the role that the father plays in children's lives. Much less common is bird's nest custody, a shared custody arrangement in which the children remain in one home and the parents take turns moving in and out.

The demographic shift away from sole custody arrangements to shared ones are based in findings from the past 25 years that indicate that children do better, both economically and emotionally, when both parents remain closely involved in their lives. Judith Wallerstein and Sandra Blakeslee (2000) cite research indicating that children who have close relationships with their fathers in childhood surge ahead of peers without such relationships in cognitive and social development. As adults, they experience greater empathy and happiness as parents. In contrast, children whose noncustodial parent distances himself or herself from them and who fails to maintain close contact develop much more anxiety, loneliness, and difficulties in adult relationships than do children who maintain a relationship with both parents.

Although shared custody arrangements seem to be preferable in most cases to sole custody in terms of children's adjustment to divorce, they can be extremely difficult to navigate. To work well, joint physical custody requires that parents continue to live near each other, preferably in the same school district, but minimally within easy commuting distance of each other. This requirement continues until all

children are at least out of high school, which may limit career or remarriage options for one or both parents if they are committed to the shared custody arrangement. In working out a schedule for sharing custody, parents have to remain flexible and find ways to communicate cooperatively with each other, a task that may seem daunting at times, especially in the early stages of the divorce. It is important to consider the children's social, athletic, and academic schedules as well as the parents'.

Some couples are unable to navigate these challenges. Carla Garrity and Mitchell Baris (1994), in a book that provides guidance for handling high-conflict divorce, describe five levels of conflict, with escalating levels exacting more emotional damage to children. Minimal conflict couples are able to cooperate on shared custody issues, exercise self-control, and find ways to resolve conflict. Mild conflict is characterized by occasional quarrels or temporary efforts to form a coalition with the children against the other parent, but these efforts are quickly discontinued. Moderate conflict is characterized by increased intensity and duration of fighting and/or attempts to discredit or berate the other parent. At this level, children begin to be seriously affected in a negative way. Moderately severe conflict is characterized by almost constant or daily fights, physical violence, continued litigation, and parental alienation syndrome, in which one parent actively attempts to exclude the other from the children's lives. Children are almost inevitably scarred by parental conflict at this level. Finally, severe conflict is characterized by all of the problems of moderately severe situations, with the addition of direct threats to the children's physical safety such as physical or sexual abuse, parental alcoholism or drug abuse, or serious psychopathology. In situations of moderate to severe conflict, these researchers recommend the creation of a parenting plan with the help of a trained mediator or therapist. The parenting plan is designed to contain or reduce parental conflict, ensure compliance with the visitation or custody arrangements in the divorce decree, and ensure that both parents maintain ongoing, but safe, relationships with the children. A parenting coordinator may be required to help the couple implement the plan.

EMOTIONAL STAGES OF DIVORCE

Every divorce is unique, and no two people will experience it exactly the same way. Nevertheless, there are clearly definable stages in the decision and recovery process that are similar to stages of grieving other losses. Divorce, even when it is wanted and planned, represents a loss of previously held hopes, dreams, and wishes for the future, as well as concrete losses such as financial stability and a familiar living situation. At first, as people are deciding whether or not to divorce, they typically experience intense ambivalence and uncertainty. The pain of a troubled marriage is weighed against the pain of ending it. People question their own ability to cope and wonder what impact a divorce will have on their future and that of their children.

Once one or both partners make a final decision to leave, emotional reactions often include a combination of shock, numbness, or denial. It is not uncommon to experience some relief as well. Symptoms of shock or denial may include sleeping more than usual, drinking or using drugs, working more than usual, or refusing to believe that the divorce is actually happening. Symptoms of numbness may include an inability to feel or to express emotions. It may be difficult to cry, and difficult even to get through the day's activities. Physical symptoms such as aches and pains or loss of appetite are also common.

The next stage of recovery is often one of extreme and alternating emotions. This phase is usually at its most intense during the first year after a decision to divorce is made. It is not uncommon to burst into tears or explode in a rage somewhat unexpectedly or with minimal provocation. Anxiety is very common, especially about what to expect, how to handle being single again, and how one will cope financially. Difficulty eating or sleeping, or eating or sleeping too much, are common symptoms. Most people experience guilt about mistakes they made during the marriage, as well as guilt about things they are doing or feeling during the divorce itself. Review work is another common part of the grieving process and involves looking back on your marriage and on your life before marriage to see what you or your partner could have done differently or how the divorce might have been avoided. Feelings of anger, failure, and loss; a sense of being unloved; loneliness; and occasional unexpected feelings of euphoria are all part of this stage.

It is extremely important to find ways to manage these stressful and unpredictable emotions. Many decisions will have to be made during the divorce process that will have an effect on your life for years to come. If you have children, it will be difficult if not

impossible to attend to their emotional needs if you have not taken care of your own. It is vitally important during times of extreme change and emotional distress that you exercise, eat healthfully, sleep, and maintain supportive social and spiritual contacts with others. It may be helpful at this time to consult a counselor or therapist as well.

The third phase of recovery is characterized by an increased focus on the self and a marked decrease in emotional pain and volatility. During this stage you may experiment with new interests and activities, find that you are interested in dating again, or realize that you are reconsidering career choices. The final phase is one of integration and a renewed sense of stability. It is a time to integrate what has happened into a new sense of identity. For people with children, a sense of being a new family, either as a single parent or as a parent and stepparent, emerges. Divorce may be experienced now as an opportunity rather than a burden. Regret may be less fraught with intense anger and blame. Relations with the ex-spouse are more likely to be cooperative and friendly.

Children go through emotional phases that are similar to those their parents experience, but for children the emotional upheaval and effects on functioning are often much longer lasting than they are for adults. In fact, there is evidence from several long-term longitudinal studies of children from divorced families that suggest that the emotional impact of divorce on children lasts well into adulthood. The best known and most widely cited of these studies has been done by Judith Wallerstein and her colleagues, who began to study 131 children and adolescents from 60 divorcing families in Marin County, California, in 1971. The children were studied intensively for 6 weeks near the time of the marital separation, and a subset of these children were interviewed again at 18 months, 5 years, 10 years, and 25 years postseparation. Wallerstein asserts that "children in postdivorce families do not . . . look happier, healthier or more well adjusted even if one or both parents are happier" (2000, p. xxiii). In fact, children who experience parental divorce, compared with children in continuously intact two-parent families, exhibit more conduct problems, lower academic achievement, more social difficulties, and poorer self-concepts. Adults who experienced divorce as children may have great difficulty navigating romantic relationships and establishing a secure sense of trust and connection to a romantic partner. Some of the factors that may contribute to these phenomena include exposure to financial and residential instability, the absence of one parent and/or parts of the extended family, the inability of the custodial parent to respond adequately to the child's emotional needs, and continued parental conflict.

HELPING CHILDREN COPE

A parental divorce is, for most children who experience it, one of the most stressful events they will ever experience. Even when children have been exposed to serious parental conflict, most would prefer that their parents stay together and that the family as they know it remain intact. Although painful to accept, it does help children if their parents realize that their divorce will, at least temporarily, cause great upheaval in their children's emotional and psychic lives and to take steps to ameliorate it. Accurate information about what is happening and what to expect can help children maintain at least some sense of control and predictability during a time of great change. Parents may think that shielding children from information will protect them from emotional pain, but this is rarely the case. For example, a child who is told that a parent is going on a vacation instead of being told that the parent is leaving the home permanently can later become fearful of any vacation or any temporary separation from a parent. For very young children, using and explaining the word "divorce" is a good idea. For children under 4 years of age, just explaining that divorce means that mom and dad will live in separate homes and that the child will spend time with each of them can give him or her an idea of what to expect. For older children, some explanation and validation of the things they have observed can be helpful. For example, it might be appropriate to explain that the parents have tried hard to resolve their differences but have not been able to do so and so have mutually decided that it would be better to divorce and create two homes. It is important to listen carefully to children's questions and concerns and make an effort to answer them accurately and empathically. It is particularly important to let children know what to expect in terms of where each parent will live, what the visitation arrangements are likely to be, and whether or not he or she will have to move. It is not necessary or advisable to give children younger than 5 or 6 details about finances, infidelities, or other private matters; however, some explanation of the reasons for the divorce decision can help allay fears that the decision was unfounded or capricious. For older children,

especially teenagers and adults, it may be appropriate to share this kind of information, and it will probably not be a surprise to them.

While it is understandable that parents wish to tell children anything that will help them feel safer and more secure, it is important not to give children false reassurance. If children are told that "nothing will change" or that they will see a nonresidential parent as often as before, they not only know it is untrue, but will face continued disappointment as they experience the inevitable changes that do occur. Reassurances that are more likely to be true might be assurances that both parents will continue to love and care about the children or that they will make every effort to protect them from harm.

Children often feel that they are to blame for their parents' marital difficulties, and even for the divorce itself. Paradoxically, younger children may feel especially guilty, despite the fact that they have less autonomy and control than teenagers and young adults. The younger a child is, the less capacity he or she has to imagine how an adult might feel or think, or to recognize that parents make choices that are not always directly about him or her. Although it might seem obvious to parents, it is important to assure children that the divorce is not their fault.

One of the most destructive elements of divorce for children's long-term adjustment is ongoing parental hostility and efforts to make a child choose one parent over the other. Children strongly identify with both parents, so making a child feel that to love one parent is to betray the other can be destructive to the child's self-esteem and feeling of security. No matter how angry one parent may be with the other, it is extremely helpful to allow the children to maintain warm and loving feelings toward both parents. Parents should never complain about the other parent to the children and should avoid having angry or hostile discussions in their presence. Each parent should encourage visitation with the other parent and should never limit phone or e-mail contact except in the rare instances in which a parent may be abusive to the child.

Parents should never put children in the position of keeping secrets from the other parent, having to spy on the other parent, or having to act as a go-between in matters of finances or legal conflicts. This creates a tremendous loyalty conflict for the child, who is connected emotionally to both parents. Remember that just because you may have ceased to love your spouse, your children have not. These situations create enormous emotional stress for children.

The effects of divorce continue over time, throughout childhood and adolescence and into adulthood. Therefore, parents may find that they have to help their children with the same issues and concerns repeatedly at different developmental stages. For example, a 6-year-old child may be satisfied with one answer to questions about why a divorce occurred, but have renewed questions and concerns about it when he or she is 12 and more questions and concerns at 19.

At any age, children's emotional and financial stability is enhanced if both parents remain actively involved in their lives. In order to do this, it is essential for them to find ways to interact in a cooperative manner. It may help to keep in mind that it is in your children's best interest to cooperate with your ex-spouse even if you feel hurt, angry, or betrayed. Each parent should make an effort to spend time with the children during the week as well as on holidays and weekends. This often means arranging custody or visitation in such a way that holidays or weekdays are alternately spent with one parent or the other. If possible, both parents should know who their children's friends are, who their teachers are, and what they are most interested in doing. Parents may alternate in attendance at school events, sports activities, and the like, or they may both choose to attend these events, but it is helpful for children to feel that both parents are interested in sharing the significant milestones of their lives.

One should try to minimize the number of changes the children experience as a result of the divorce. If it is possible to keep them in the same school and to maintain the home in which they were living before the divorce, that will help. If possible, they should continue with their customary activities and friendships. Parents should encourage children to talk about their feelings, wishes, and fears about the situation. This is not always easy to accomplish. It can sometimes help to read a book together or to discuss the divorce experience that children in a movie or TV show are having.

Most children whose parents are divorcing will have a range of emotional reactions, including fear, sadness, anger, and confusion. Many parents assume that their children are adjusting well to a divorce because they do not express these feelings directly. However, children may exhibit other signs or symptoms of emotional distress, such as poor school performance, withdrawal from social activities, physical illnesses, sleep difficulties, eating problems (overeating or excessive dieting, especially among teens), or delinquent activities. Some children become

"hyper-responsible" and take on a role of caring for the distressed parents both emotionally and in terms of practical matters such as preparing meals or handling bills. Many parents find that helping a child handle angry feelings, especially anger at the parent, is a particularly daunting task. Parents should help children understand that feelings are signals. Anger can be a signal that something is wrong or unfair. When one's parents divorce, children typically feel a sense of helplessness and powerlessness since they had no say in the decision. Helping children find ways to express their anger and frustration in a safe and acceptable manner can help. For example, talking about angry feelings, drawing pictures, or playing hard in sports or athletics may be ways of letting go of angry feelings. Allowing children to participate in decisions such visitation arrangements or decorating their new home or room may help them achieve some sense of mastery or control of an uncontrollable situation.

—D. Kim Fuller

See also Deadbeat Dads; Divorce Mediation; Hetherington, E. Mavis; Marriage; Single-Parent Family; Stepfamilies

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DIVORCE MEDIATION

Divorce mediation is the use of a third-party neutral mediator who assists parties in developing their own financial and parental agreements at the time of a divorce. The mediator, unlike a judge, has no authority to impose a decision on the parties. Mediation encourages the parties to communicate directly and fashion an agreement that suits their particular needs. Mediation is often used in situations where emotions run high and parties will continue to have a relationship after the resolution of the present conflict. In most divorce cases, both of these characteristics are present since most marriages ending in divorce involve children.

Although mediation is an ancient practice in many cultures, its widespread use in divorce cases in the United States is of relatively recent origin. California established court-connected conciliation services in 1939, the aim of which was to promote reconciliation in marriages. The focus later shifted to divorce counseling and child custody mediation. During the 1970s, attitudes toward divorce began to change in the United States. As a result, many states abandoned the system whereby a judge was called upon to decide whether one of the parties was guilty of a marital "fault" such as adultery, abandonment, or abuse. Instead most states moved to a system of "no-fault" divorce, allowing the spouses themselves to determine whether to continue the marriage. Issues related to property division began to resemble business partnership dissolution proceedings and became more predictable as well. It followed then that parties took the opportunity to privately order their divorce and began to look for ways to do so with the assistance of a nonjudicial third party.

In 1978, O. J. Coogler, an attorney and marriage counselor, established one of the first family mediation centers in Atlanta. In his book entitled *Structured Mediation in Divorce Settlement,* he outlined a process for resolving the issues attendant upon divorce using a facilitator.

While mediation is often used to resolve issues relating to the economic aspects of divorce, its most common application is in the area of decision making regarding children. Psychological research in the 1970s and 1980s concluded that children would benefit after divorce from a continuing relationship with both parents. This research, in addition to other political and social trends, led to the enactment of joint or shared custody statutes in many states. These arrangements required more planning and cooperation on the part of parents. Mediation is seen as a process that allows parents to create agreements that best suit their families and at the same time help to build a relationship that will encourage ongoing cooperation. A majority of states now require mediation for child custody disputes before parents can ask for a court to make a decision about the care of their children.

Mediation of property issues related to divorce is usually conducted by a lawyer who acts as the mediator. The lawyer does not represent either of the parties in the divorce but rather assists them in creating a settlement agreement that is then reviewed by their own attorneys. Mediation of child custody disputes is generally performed by lawyers, mental health professionals, and employees of the court who are specially trained for this function. The courts are still involved in divorce cases because divorce agreements must be approved by the judge who will grant the divorce.

Divorce mediation is not without its critics. Some worry that without lawyers to negotiate on behalf of clients, a spouse might be taken advantage of in mediation. Proponents of the practice respond by noting that mediators are trained to identify and address such power imbalances and that most parties will have lawyers who, while not present at the mediation, will nevertheless review the agreement before it is finalized.

There are no standard requirements for becoming a mediator. Many programs and states set their own qualifications, which generally include some educational credentials as well as specialized training.

—Mary Kay Kisthardt

See also Deadbeat Dads, Divorce

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DOMESTIC VIOLENCE

Every family has conflict, but families differ in the ways they resolve arguments, disputes, and disagreements. For some families and couples, attempts to settle differences can escalate into domestic violence, typically perpetrated by one family member. Domestic violence is either the occurrence or a pattern of abusive and coercive behaviors, including physical, sexual, and psychological abuse, as well as economic coercion, between partners or family members. Domestic violence negatively influences child development and family life in numerous ways.

HOW COMMON IS DOMESTIC VIOLENCE?

Approximately 9 million incidents of physical violence occur every year according to the U.S. Department of Justice. The majority of victims are women and children. In fact, 1 out of every 5 women reports having been assaulted by an intimate partner during her lifetime, versus 1 out of every 14 men. Women are also much more likely to be injured than men. Most victims of violence live in families, and the majority of incidents occur in victims' homes. Violence against women often co-occurs with child abuse, which is the leading cause of death in children under the age of 1 year. In fact, 3 to 10 million children are thought to be exposed to violence each year. Because many incidents of violence are not reported to authorities, it is believed that domestic violence is far more prevalent than rates reported by official studies.

COSTS AND CONSEQUENCES OF DOMESTIC VIOLENCE

Each year it is estimated that domestic violence costs the United States $67 billion. These costs to

victims, their families, and society include lost school and workdays, medical and mental health costs, property damages, and legal costs in the victim's services and criminal justice systems. In addition, there are costs when the offender is incarcerated, such as lost family wages and incalculable psychological damages to family relationships. Society also accrues significant losses in second-generation costs for future victims and offenders of violent crimes. There is increasing evidence that street criminal violence may be exacerbated by domestic violence as well.

DOMESTIC VIOLENCE AND ITS IMPACT ON FAMILIES

Children are victims of violence even when they do not experience the abuse firsthand. For example, trauma symptoms appear to be more common in children who are exposed to violence, as are emotional and behavioral problems. Children who witness violence between family members frequently are victimized themselves, and child abuse can increase the likelihood that later in life a victim will abuse substances or have psychological difficulties. Although the majority of children who are abused or who have witnessed violence do not grow up to become abusive, children who are exposed to violence in the home are more likely to be abusive to their partners as adults and to be more aggressive than children not exposed to violence.

RISK FACTORS FOR DOMESTIC VIOLENCE

Although there is no one particular cause to explain domestic violence, there are several important risk factors known to be associated with domestic violence. Men who witnessed parental violence are more violent in comparison with men who were not exposed to parental violence. Alcohol use is thought to be involved in one out of four incidents of violence against women, and when alcohol is present, injuries tend to be more severe. Violence between partners occurs most commonly between ages 18 and 30 and among families who are of low socioeconomic status. Although women are reported to initiate violence as often as men, they are not as severely violent, often engage in violence out of self-defense, and commit a much smaller proportion of intimate homicides than men. Social attitudes condoning violence against partners may also be related to domestic violence. Men who think they have the right to control and punish their women partners tend to be more violent than men who do not share these beliefs. Violence is more common in households in which women have little work experience, depend on their male partners for financial resources, and have young children at home. Impulsivity, the inability to regulate emotions and behaviors, including aggression, is also a risk factor for the perpetration of domestic violence.

PREVENTION OF FAMILY VIOLENCE

It is important for responses to domestic violence not only to include reporting and investigation efforts but also to engage in prevention and treatment. There is a variety of models for prevention that has been utilized, tending to focus on advocacy and education. Advocacy groups speak out about the costs of domestic violence and work to improve education as well as treatment, deterrence, and policy efforts. These groups include the National Coalition Against Domestic Violence and the National Organization for Victims Assistance. Many cities have local domestic violence projects or councils that can direct people to community research, legal aid, and resources (e.g., http://www.growing.com/nonviolent/index.htm). Public education campaigns on the dangers of abuse appear to be having an impact as more people consider the physical punishment of children to be harmful.

Educational efforts to teach elementary school children about domestic violence have suggested that these programs do appear to increase children's knowledge and protection skills. These programs are being mandated in school settings at increasing rates. High school and college programs to combat dating violence and sexual assault have been shown to alter beliefs and attitudes toward violent behavior. Training programs to educate legal and health care professionals about signs, warnings, and effects of domestic violence have been increasing as well, with some regulatory bodies requiring that their members complete courses as part of their licensure requirements.

TREATMENT OF FAMILY VIOLENCE

There are a number of different treatments for domestic violence offenders, victims, and families. More comprehensive treatment approaches for batterers tend to include an intake process, typically at the first contact with the criminal justice system; a psychological assessment to assess future dangerousness and

develop treatment plans for mental illness, substance abuse, illiteracy or other needs; an orientation to the services planned and preparation for treatment; group therapy, often including anger management training, feminist education, and relationship skill building; and development of a follow-up plan that might include self-help groups or the staggering of group meetings. Mandatory court reviews in which offenders are scheduled to appear in court at a specified time to report their progress in treatment appear to improve compliance. There is growing evidence that treatments for batterers are effective in reducing future violence, but little evidence exists to suggest that any one mode of treatment is best across all types of batterers.

Treatment plans for survivors of abuse often begin with safety planning in which victims identify ways to get out of their homes quickly and safely with documents and items of importance already prepared, set up independent bank accounts and funds, and get to shelters. There are programs that provide cell phones programmed to call 911 in case of emergencies that can be helpful in securing protection rapidly. Shelters can provide protection for victims, assist with obtaining orders of protection and temporary welfare benefits, and help victims prepare for employment. Support groups can continue to provide ongoing support for abuse survivors as they make these transitions. Resources for victims can be obtained from the National Domestic Violence Hotline, 1-800-799-SAFE.

Children who have been exposed to domestic violence either as witnesses or victims can benefit from treatment as well. Most often treatment occurs in groups, either in shelters, safe homes, family court clinics, or community mental health facilities. The main focus of these groups is to help children label their feelings about the domestic violence, manage their anger, develop safety skills, secure social support, positively expand their self-concept, relinquish any responsibility they may feel for the domestic violence, increase their understanding of violence, and increase their skills in family communication. Studies suggest that the groups are most helpful in changing children's attitudes and reactions to anger and aiding them to let go of any responsibility for the domestic violence. The National Coalition Against Domestic Violence has a list of local resources to access for treatment for children.

Domestic violence is known to occur among the elderly and within gay, lesbian, or bisexual families. Resources are emerging to address intervention and treatment issues relevant for these specific populations. Further information on abuse within gay, lesbian, or bisexual relationships can be found at the National Coalition of Anti-Violence Programs (http://www.avp.org/ncavp.htm), and information on elder abuse can be found at the National Center on Elder Abuse.

—Sharon G. Horne and Heidi M. Levitt

See also Battered Child Syndrome, Battered Woman Syndrome, Child Abuse

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DONOR INSEMINATION

Although an inadequate number of sperm contributes to approximately a third of all infertility, there had been little, if any, effective treatment for low sperm counts until the introduction of intracytoplasmic sperm injection in the late 1990s. As a result, the insemination of women with the sperm of anonymous donors, known as donor insemination (DI), has been widely practiced in this and other countries for almost half a century and has resulted in the births of hundreds of thousands of children. Although DI is not illegal anywhere in the United States, only a minority of states have laws guaranteeing the legality and legitimacy of DI. Often these laws are cursory or limited to specifying financial support obligations.

Sperm for DI is purchased from commercial sperm banks that screen and test prospective donors to minimize the risk of a sperm-transmitted infection and to reduce the chances of birth defects and genetic diseases. Because of concerns about human immunodeficiency virus (HIV) transmission, the tested sperm is frozen and quarantined for 6 months. Available information about the donor may range from the rudimentary physical characteristics of height, weight, eye color, hair color, and ethnicity to more detailed personal information such as education, occupation, interests, and hobbies. Although most sperm donors remain anonymous, the relative candor about infertility and the social and ethical questions raised by the introduction of advanced reproductive technologies, including egg donation, may well lead to changes in how DI is practiced in the future.

Although the majority of DI parents in the United States have not planned to tell their offspring how they were conceived, this issue remains highly controversial. Indeed, the disclosure decision is a serious and ongoing issue for DI parents that in many cases remains incompletely resolved or even undecided for many years. Psychologists, ethicists, and social workers have generally concluded that the use of donor sperm is ethically suspect and psychologically burdensome (or even harmful) if practiced in an atmosphere of secrecy, frequently referring to an adoption model that holds that children raised without knowledge of their genetic heritage have an incomplete sense of identity. Yet as very few studies have actually looked at the psychological and social functioning of families created through the use of a donor, current opinions concerning the well-being of the couple and their children cannot be reliably verified or refuted.

Parents who disclose to their children usually cite honesty or the principle that it is the child's right to know his or her biologic origins, while parents who do not plan to tell their children usually refer to a broad concept of privacy and confidentiality that suggests that they are wary of subjecting themselves and their children to public scrutiny and judgment. Regardless of their disclosure decision, most DI parents emphasize the importance of a spiritual and emotional connection with their children and often state a belief in the preeminence of the social parenting role, asserting that parental responsiveness, rather than biological relatedness, is responsible for fostering healthy social and emotional development. Although most DI parents come to a united disclosure decision that reflects and supports their beliefs in what is best for the child and the family unit, they continue to grapple with a broad range of issues and concerns that interacts in complex and subtle ways. Because the disclosure decision-making process involves an interaction between the psychological states of the parents and the social, cultural, and familial context within which this decision must be negotiated, DI parents will likely experience some degree of ongoing tension until cultural attitudes concerning the relative values and meanings of biological versus social fatherhood have further evolved.

—Robert D. Nachtigall and Gay Becker

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DOWN SYNDROME

Down syndrome is a chromosomal disorder that affects more than 350,000 U.S. citizens. Down syndrome ranks second to fragile X syndrome as the most frequent genetic cause of mental retardation. Although recognized by Edouard Seguin, a French physician and educator, as early as 1846, the first written description of the disorder was published in 1866 by John Langdon Down, a British physician from whom the syndrome derives its name. Jerome LeJeune, a French geneticist, and his colleagues established the genetic basis of Down syndrome in 1959.

Down syndrome is estimated to occur in 1 in 1,000 live births. The syndrome can be diagnosed prenatally through chromosomal analysis derived from either chorionic villus sampling or amniocentesis. Boys outnumber girls 1.3 to 1.0, and the disorder occurs in all racial and ethnic groups. Down syndrome is predominantly (95% of cases) due to trisomy of chromosome 21, involving a nondisjunction or failure of the two chromosomes of pair 21 to separate during meiosis prior to ovulation. Five percent of Down syndrome cases result from translocation in which part of chromosome 21 attaches to another chromosome or from mosaicism due to an error in cell division soon after conception. Increased maternal age is related to both nondisjunction and mosaicism. Down syndrome is incurable. The only current preventive strategy is termination of pregnancy, an option that appears to be increasingly utilized.

PHYSICAL AND MEDICAL ASPECTS

Affected individuals share to varying degrees a set of physical characteristics. The most common features of Down syndrome include a flattened face with a recessed bridge of the nose; upward slanting eyes with epicanthal folds; small ears and mouth; large tongue; short, broad hands and feet; stubby fingers; broad neck; stocky appearance; and loose skin folds at the nape of the neck. Down syndrome has a large number of associated medical problems including congenital gastrointestinal and cardiac abnormalities, eye problems, low muscle tone, and mild to moderate conductive hearing loss secondary to chronic middle ear infections. Infants and young children with Down syndrome are also at greater risk for acute leukemia than the general population.

High rates of hypothyroidism have also been linked to Down syndrome, using normative values from the general population. Lower thyroid functioning values for people with Down syndrome may reflect the susceptibility of adults with Down syndrome to experience "premature aging" and not thyroid disorder. Despite increased truncal obesity among people with Down syndrome, traditional risk factors for type II diabetes and cardiac disease, including hypertension, elevated lipids, and elevated glucose, are less than those reported by the general U.S. population.

DEVELOPMENTAL ASPECTS

Children with Down syndrome are delayed in reaching early developmental milestones compared with typically developing children. In particular, gross motor development is attained at later ages in children with Down syndrome. Independent sitting is usually attained at 1 year of age, while independent walking is not achieved until 2 years of age. Early language development, especially language production, is also slow to progress.

People with Down syndrome typically function within the mild to moderate range of mental retardation on standardized intelligence tests, although some function in the borderline range and a few have severe mental retardation. The intellectual impairments of people with Down syndrome are generally attributed to a reduction in the size of the cortex and cerebellum relative to matched controls and an immaturity of brain development evident in neurons and their synaptic connections. People with Down syndrome show greater deficits in verbolinguistic skills relative to visuospatial skills. Delayed language acquisition may be related to the overall slowed intellectual development revealed in longitudinal studies of infants and

young children with Down syndrome. People with Down syndrome mosaicism typically have IQs that are 12 to 15 points higher than people with trisomy 21. Adaptive behavior is generally commensurate with intellectual ability.

Children with Down syndrome show more maladaptive behaviors than typically developing children, but have a lower risk for psychopathology than other children with intellectual disabilities. Commonly occurring problems include oppositional behavior, stubbornness, and inattention. Research suggests that maladaptive behaviors are most prevalent during adolescence. Adults with Down syndrome show fewer externalizing problems but may have increased internalizing problems such as depression. However, stubbornness often remains characteristic of people with Down syndrome across ages. Interestingly, 7% to 8% of people with Down syndrome may meet criteria for autism.

Children with Down syndrome express fewer positive social signals, show delayed responsiveness, and generate less predictable responses in mother-child interactions than typically developing children. Without clear and frequent signals from their children, mothers of children with Down syndrome may be more likely than mothers of typically developing children to adopt a controlling and directive interactive style during naturalistic play.

Parents of children with Down syndrome report experiencing less stress and feeling more rewarded by their children than do parents of children with other intellectual disabilities. Similarly, siblings of children with Down syndrome experience fewer adjustment problems than siblings of children with other intellectual disabilities. Reasons offered for this Down syndrome advantage include mothers being "older and wiser," parents having a better understanding of their child's condition than parents of children with less researched syndromes, greater sociability and cheerfulness of children with Down syndrome compared to children with other learning difficulties, greater public knowledge and recognition of Down syndrome, and the perceived youthfulness of people with Down syndrome due to their immature-appearing physical features and "babyfaceness."

AGING

People with Down syndrome have a greater early mortality rate as compared to people of similar ages from the general population and to people with comparable levels of mental retardation due to other causes. Congenital heart disease contributes greatly to the increased early mortality rate, but so do respiratory tract infections, leukemia, and congenital gastrointestinal tract anomalies. Although improved medical management of respiratory infection and congenital heart disease in young children with Down syndrome has significantly increased the life expectancy, people with Down syndrome have lower life expectancies than the general population. The average life expectancy for people with Down syndrome is approximately 55 years.

Interestingly, genes linked to the development of dementia of the Alzheimer type are also located on chromosome 21. The triplication of chromosome 21 may result in an increased risk for developing Alzheimer's dementia. Seventy-five percent of adults with Down syndrome over 60 years of age show neurological abnormalities and behavioral signs of Alzheimer's disease. These symptoms frequently include seizures, personality change, focal neurological signs, apathy, and loss of conversational skills. The allele for the gene apolipoprotein E (ApoE) may affect the risk for Alzheimer's dementia. Down syndrome people with the ApoE e4 allele have been found to have a heightened risk for developing Alzheimer's type dementia, whereas the ApoE e2 allele may serve as a preventive factor. Recent studies suggest that Aricept (donepezil hydrochloride), a drug targeting deficiencies in cholinergic neurotransmission, may improve cognitive functioning, and specifically language performance, in nondemented people with Down syndrome and slow deterioration in cognitive functioning and adaptive behavior among people with Down syndrome and Alzheimer's type dementia.

High rates of epilepsy (8% to 13%) have been noted among people with Down syndrome. It is estimated that 40% of cases begin before 1 year of age and another 40% appear in the second to third decades of life. Early-onset epilepsy often involves infantile spasms and tonic-clonic seizures with myoclonus, whereas epilepsy in adults typically involves partial simple or complex seizures and may be associated with Alzheimer's disease. Prevalence of epilepsy is thought to increase with age and is estimated to be as high as 46% among adults with Down syndrome who are over 50 years old.

INTERVENTIONS AND COMMUNITY LIVING

Infants and young children with Down syndrome typically receive early intervention designed to help

them reach their fullest developmental potential. Although it remains unclear whether early interventions lead to increased intelligence, improvements in independence, community functioning, quality of life, language, and motor skills have been shown. Reading, writing, and arithmetic are commonly combined with daily living and social skill training for school-aged children and adolescents with Down syndrome. Successful transitions from school to work and family to community living hinge on obtaining the necessary skills for self-care, maintaining strong interpersonal relationships, and developing appropriate work habits and skills.

Lifelong programs aimed at monitoring nutrition, preventing obesity, and maintaining bone density are associated with improved health outcomes. These programs commonly include food selection, behavioral interventions, physical activities, and social activities. Programs targeting exercise and health education have been found to increase positive attitudes toward exercise, increase life satisfaction, and slightly reduce risk for depression. Cognitive and affective (e.g., too boring and too difficult) and pragmatic obstacles (e.g., lack of transportation and high costs) often hinder people with Down syndrome from engaging in fitness programs.

Adults with Down syndrome typically live in family homes, community group homes, or in independent or semi-independent living situations. Many adults with Down syndrome maintain paid employment, often with some support (e.g., supervision, training, or transportation). Increased longevity requires parents to adopt a long-term perspective in planning for their child with Down syndrome.

—William E. MacLean, Jr., and Sigan L. Hartley

See also Mental Retardation

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DRUG ABUSE

The majority of people *use* drugs. Caffeinated soft drinks, aspirin, or prescription medications are legal, and they are consumed widely by children and adults. In addition, many people drink alcohol or smoke cigarettes despite the fact that these products are legal only for adults. Finally, some people use drugs that are illegal for everyone, such as cocaine or methamphetamine. Unfortunately, many people who use drugs also abuse them.

DRUG ABUSE DEFINED

In drug abuse, the social and health-related costs are greater than the benefits. By this definition, much drug use is abusive.

Social costs of drug abuse include the deterioration of relations with other persons such as failure to carry out responsibilities, arguments, abuse, lost income, and time spent in jail or drug treatment.

Health-related costs of drug use include addiction, a physiological or psychological need for the drug. Other health-related costs include diminished physiological capacity, illness, and death. In 1998, 19,277 deaths were caused by the use of illegal drugs.

Social benefits of drug use include enhanced capacity in relations with others, as with psychotropic drugs that reduce symptoms of mental illness. Health benefits of drugs include regulation of bodily functions, as with thyroid hormone that controls metabolism. Health benefits of drugs also include management of disease agents such as fungi, bacteria, or viruses. Studies show

that for every passing year, life expectancy increases 3 months. Most of this increase is due to the effectiveness of drugs in treating disease.

THE DRUG INDUSTRY

Worldwide, the pharmaceutical industry produces more than 400,000 products. Together with the alcohol and tobacco industries, the worldwide drug business is worth perhaps a trillion dollars per year. Currently, world organizations are complaining that health is being degraded by widespread marketing of cigarettes to children, and the cost of prescription medicines is too high for poor nations to treat pandemics such as acquired immunodeficiency syndrome (AIDS).

REGULATION OF DRUG USE

Until the 20th century, laws did not regulate production, distribution, or consumption of alcohol, tobacco, or other drugs, except for a few laws against public drunkenness. Today, production, marketing, distribution, and use of most drugs are regulated. Alcohol and tobacco products are taxed, and heavy criminal penalties are imposed on illegal drugs.

RATES OF DRUG USE AND ABUSE

Most drug abuse has its roots in adolescent experimentation with alcohol, tobacco, and other drugs. In the United States, the rates of use of alcohol, tobacco, and other drugs have been tracked by the Monitoring the Future project. In 2003, 48% of seniors in high school reported that they drank alcohol in the preceding month. In 1975, the rate was 68%. The rate for marijuana use was 21% in 2003, and in 1975 it was 27%. In 2003, the rate for smoking cigarettes by adolescents was 24%, and in 1975 it was 37%.

In 1998, there were 3.3 million hard-core users of heroin and cocaine in the United States, and as many as 7 million persons may need drug treatment. Among adults, 25% smoke cigarettes, and the rates for men and women are about equal. Smoking peaked in the 1940s, when well over half of the adult male population smoked. Currently, approximately half of persons 12 years of age or older drink alcohol. The rate for men is 57%, and the rate for women is 45%. Almost 7% of the population 12 or older are heavy drinkers who have five or more drinks 5 or more days per month.

From 1992 to 1998, deaths from the abuse of illegal drugs decreased from 24,000 to 19,000. In 2000, more than 2,500 deaths occurred from alcohol abuse and more than 13,000 persons were killed in alcohol-related traffic crashes. By far the largest killer is tobacco. In 1999, tobacco smoking killed more than 440,000 persons.

MONETARY COSTS OF DRUG ABUSE

In the United States from 1988 to 2000, the cost of buying illegal drugs decreased from $116 billion to $63 billion. However, the indirect costs of drug abuse are much higher. In 2000, they were $167 billion per year. The indirect costs include health care (drug treatment, violent crime due to drug abuse, treatment of related illnesses including drug-exposed infants, human immunodeficiency virus [HIV]/AIDS, and tuberculosis), lost productivity (premature death, illness, hospitalization, and incarceration), and other costs (police protection, spending to reduce supply, and legal fees). The indirect costs of alcohol abuse are one and one-half times higher than those for illegal drug abuse, and the costs of tobacco abuse are as high as those for alcohol abuse. Including the costs of buying these drugs, costs total perhaps a trillion dollars per year, more than $3,500 per citizen, or about half of the federal budget.

ABUSE OF PRESCRIPTION DRUGS

Abuse of prescription drugs has tripled in the past 2 years, and currently this form of abuse has outstripped the use of all illegal drugs except marijuana. In abuse of prescription drugs, orders are placed through a Web site outside of the United States where regulations are less stringent, or the drugs are obtained via "doctor shopping," a process in which one who is not ill finds a physician who will write a prescription for a drug that is not indicated by the person's medical condition.

MORAL AND ATTITUDINAL ISSUES

Surveys show that drug use patterns are segmented into two polar opposite groups: abstainers/occasional users and heavy/problem users. This pattern has been part of the creation of a moral climate of indignation and lack of sympathy for drug abusers. Following this split, laws and other drug abuse policies have emphasized punishment for drug abuse, and they have deemphasized treatment.

This process can be seen readily in reaction to tobacco smoking. Smoking has been banned in public

places because of the health risks of second-hand smoke (and because of the socially unacceptable odor associated with it). Increasingly, tobacco smokers are treated as outcasts. In addition, due to successful lawsuits against tobacco companies for marketing an unsafe product, state governments in the United States have received large monetary settlements. These settlements are intended to mitigate the costs created by smoking, but the states have put the funds to a variety of uses, including the balancing of state budgets. The greatest growth of tobacco sales has been in poor countries where the laws are not as strict.

POLICIES ON ILLEGAL DRUGS

In an effort to address the problem of drug abuse, the War on Drugs was begun in the 1980s. It represented an attempt to limit the supply of illegal drugs in the United States that were imported or produced domestically. It involved the hiring of more police officers and stricter penalties for drug offenses. In 2000, the cost of these programs was $5.5 billion. In addition, the War on Drugs attempted to curtail the demand for drugs through drug education and by sending many drug users to jail. Current estimates show that about 30% of inmates are serving time for drug violations. The War on Drugs appears to have decreased use and abuse slightly and to have shifted the substances of choice from imported drugs such as cocaine to domestically produced drugs such as methamphetamine.

DRUG EDUCATION

Since the 1980s, drug education has focused on youth. Beginning in elementary school, programs such as the 17-week Drug Abuse Resistance Education (D.A.R.E.) have sought to delay the onset of experimentation with alcohol, tobacco, and other drugs. The tenet is that the later youth begin to experiment with drugs, the less abuse will occur. D.A.R.E. uses uniformed police officers in the classroom to deliver a message that use of alcohol, tobacco, and other drugs has negative consequences. Officers also teach youth how to resist peer pressure to use these substances. Evaluations of D.A.R.E. has shown it to have some short-term benefits in raising social skills, making attitudes toward drug use more negative, and building positive attitudes toward police. No long-terms effects have been shown.

DRUG TREATMENT STRATEGIES

Seven million people in the United States need drug treatment, and 1 million people receive it each year at a cost of over $6,000 dollars per case. Some individuals participate in one program after another. Alcoholics Anonymous (AA) is the most famous program for the treatment of alcohol abuse. AA uses peer pressure and support as the main mechanisms of treatment. Treatment strategies for other types of drug addiction have borrowed principles from AA. Often, treatment takes place in a residential facility, and counselors use the mechanism of resocialization. Typically, treatment lasts several months, and the self-concept of the abuser is isolated and torn down so that it can be reconstructed as a responsible adult self.

Another method of drug treatment is for an agency to administer a less addictive drug to the abuser, such as methadone treatment for heroin users. The goal of this type of treatment is to gradually decrease the dose until the person no longer is addicted. Unfortunately, this process of weaning may not be effective, and some of the drugs used in the treatment of drug abuse are themselves addictive. Thus, programs of drug treatment can become maintenance programs for drug addiction rather than cures. Advantages of maintenance programs are that they remove addicts from the illegal drug market, and they may have indirect health benefits such as addicts no longer sharing contaminated needles.

SUCCESS OF TREATMENT

Results from Florida may be typical of treatment success rates. A study of nine medium-intensity drug treatment programs at 26 facilities was begun in 1991 for drug abusers who had failed in an outpatient setting. From then until 1999, almost 19,000 persons had been admitted. Fifty-three percent completed the 6-month programs. Of these persons, 54% were not recommitted to prison or supervision after 2 or more years. A parallel study that analyzed data from almost 4,000 offenders in six treatment programs of 9 to 18 months in length for extreme substance abusers who had several previous treatment failures showed that 30% of participants completed the program, and of these, 56% were not recommitted to prison or supervision after 2 or more years.

Since surveys show that 70% of smokers would like to quit, smoking cessation for the 48 million tobacco

smokers in the United States has become big business. Drug companies (including ones that also sell tobacco products) market products that deliver nicotine in chewing gum or through patches worn on the skin. One company even sells a pill that aims to decrease nicotine withdrawal, the intense cravings that follow a decrease in the dose of the drug. Research from over 50 studies using nicotine replacement or the pill shows that about one fourth of the research subjects receiving the drug were able to quit for 6 months or more.

THE FUTURE

A problem in trying to control the supply of illegal drugs is that poor farmers who produce the raw materials can make more money by producing illegal crops than they can by raising and selling legal crops. In response, government programs have subsidized legal crops and corporations have encouraged farming families to sew clothing or to make high-end buttons from locally produced nut shells.

Complicating the problem of illegal drug production of opium poppies in Afghanistan and coca in Colombia is the fact that the processors and exporters of the illegal drugs have armed themselves and taken over political control of drug-producing regions.

In the United States, domestic production of illegal drugs has presented additional problems. Marijuana can be grown almost anywhere, including indoors. In addition, methamphetamine can be made from commonly available chemicals in small, inexpensive, mobile laboratories. Instructions on the cultivation of marijuana and the manufacture of methamphetamine can be found easily on the Internet. In addition, many people can make more money by selling illegal drugs than they can by doing legitimate work.

A movement toward the legalization of marijuana has been underway in the United States for decades. Current laws in most states in the United States have reduced penalties for possessing small amounts of marijuana. Recently, several court decisions have made the use of marijuana legal for medical reasons such as appetite regeneration for chemotherapy patients. While the Prohibition Laws of the 1930s showed that the government could not curtail illegal behavior that was popular among adults, it is not known how legalizing a previously illegal drug, like marijuana, could affect abuse.

—Richard L. Dukes

See also Addiction, Cocaine, Marijuana

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DRUNK DRIVING

Drunken driving motor vehicle crashes remain a leading cause of death and injury to people in the United States. In fact, motor vehicle crashes are the leading cause of death among people 16 to 24 years of age, and a substantial percentage are alcohol-related

crashes. There were 17,419 alcohol-related automobile deaths in 2002, representing one alcohol-related motor vehicle death every 30 minutes. Part of the reason for these statistics is that arrests have been made in only 1% of the 120 million self-reported episodes of driving under the influence of alcohol or drugs (DUI). Younger people are more likely than older people to be involved in alcohol-related crashes. In fact, one fourth of the motor vehicle deaths among 15- to 20-year-olds were alcohol related. Furthermore, approximately 66% of children under 15 who died in alcohol-related motor vehicle deaths between 1985 and 1996 were passengers of an impaired driver. In addition to the costs of drunken driving measured in human lives, the National Highway Traffic Safety Administration reported that alcohol-related crashes in 2000 were associated with more than $51 billion in total costs.

A major determinant of alcohol-related motor vehicle crashes is the age at which a person started drinking. Researchers have shown that people who began drinking alcohol at an earlier age were more likely to report driving after drinking too much and being in a motor vehicle crash because of their drinking even after adjusting for current/ever diagnosis of alcohol dependence and number of years the person had been drinking. Education and interventions geared toward delaying alcohol use among young people may be an effective means of reducing drunken driving crashes and deaths. There are additional effective measures to reduce drunken driving in the United States. Among these preventative measures are license suspension of drivers arrested for DUI, lowering the legal blood alcohol content (BAC) limit to 0.08% in all states, zero tolerance for drivers less than 21 years of age, and sobriety checkpoints. There are also policy level interventions, including increasing federal and state alcohol excise taxes and treatment approaches such as multifaceted community alcohol control and DUI prevention programs. Research has also shown that people who participate in a driver intervention program after a DUI arrest were less likely to be charged again with an alcohol-related driving offense or to be the driver in an alcohol-related crash than a similar group who were jailed.

Consistent law enforcement of DUI laws, national reduction of the permissible BAC to 0.08%, and zero tolerance for underage drinkers appear to the most effective means. For long-term, effective behavioral change, it is also necessary to change social norms of drunken driving so that there is zero social tolerance of drunken driving.

—Matthew J. Zagumny

See also Addiction, Alcoholics Anonymous, Alcoholism, MADD (Mothers Against Drunk Driving)

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DUAL-EARNER HOUSEHOLDS

One of the most significant transformations over the past 50 years has been the growing proportion of women earning an income from paid employment after marriage and childbirth. In the 1950s, more than 70% of American families maintained a "traditional" employment structure comprising a male breadwinner and an economically inactive wife. By the 1990s, this arrangement gave way to the norm in couple families of both

parents pursuing employment outside the home, often for long hours. Notwithstanding a general decline in the proportion of "nuclear" families, and increased household diversity associated with delayed family formation and single parenthood, the majority of children in Western countries grow up today with two working parents.

Dual-earner household proliferation stems from both cultural change and economic restructuring. Cultural influences include the women's liberation movement, advances in contraception (contributing to smaller families and control over the timing and spacing of maternity leave), rising consumer expectations, and a common perception that paid work confers higher status and a stronger source of identity than homemaking and motherhood. Economic restructuring charts the decline of heavy industry and manufacturing and with it a permanent loss of skilled blue-collar jobs previously paying large numbers of men a family wage. New jobs that have opened up in the service sector generally call for skills that are socially constructed as "feminine," paying low wages for nonstandard working hours. The combined effect of women's increased employment opportunities, reduced male earnings, and widespread job instability is that most couples believe they need both partners to work if living standards are to be maintained. This is especially true where the cost of living (notably house prices relative to incomes) is rising.

The normalization of a dual-earner structure is remarkably consistent throughout the Western world. In a survey of Australia, Canada, Great Britain, and the United States, for instance, O'Connor and colleagues found 60% to 65% of women in couples with children in dual-earner structures. Yet this population of dual-earner households is not homogeneous. The dual-earner strategy has a far longer history in African-American than in White middle-class families, for example. Similarly, cross-national variation exists in the working hours, occupational status, and child care arrangements of dual-earning parents. Used too broadly, the term can obscure important differences between partners who both work full time and those who combine full-time (male) with part-time (female) employment. Moreover, it is usual in the literature to differentiate between couples working for an hourly wage and those where partners are equally committed to a rewarding career. The former are sometimes referred to as two-job households and the latter as dual-career households. Labor force survey data for the United States and United Kingdom indicate that only a minority (10% to 20%) of dual-earner households represent the dual-career type most likely to feature gender role equality. A similar-sized minority represents two-job households with both parents working full time, but in less skilled, sometimes poorly paid jobs.

It is important not to assume that the dual-earner household is synonymous with a dual-career arrangement. Indeed, with the possible exception of the Nordic countries, notably Sweden, where state policy supports an egalitarian model of work life balance, it is questionable whether a truly symmetrical structure of shared earning and coparenting exists anywhere in practice. Rosemary Crompton positions the idealized dual-earner/dual-career arrangement at the extreme end of a continuum that begins with the traditional male breadwinner/female career model. She argues that in situations where dual-earner households constitute one and one-half income couples, as is typical in the United Kingdom, this represents a "modified breadwinner" arrangement perpetuating traditional gender roles. Further along the continuum are dual-earner structures based on more equal earning arrangements, where care is provided for dependents either by the state (as in ex-state-socialist countries) or the market (as is typical in the United States and Canada) and parenting is still generally asymmetric. Notwithstanding emphasis on market provision, child care falls extensively to mothers and grandmothers in modified breadwinner arrangements.

Academic interest in the dual-earner household takes three forms. The first concerns the relative importance of the state, the market, and the family in stimulating proliferation of this household type. On the one hand, the reason why women in the United States tend to work full time after maternity leave might be explained by a welfare regime emphasizing self-reliance through private market provision. Scott and Dunscombe point out that health care insurance in the United States is costly and generally only available to full-time workers. On the other hand, the local transmission of gender roles and parenting standards might be said to exert a powerful cultural influence on a mother's decision to reduce her hours or drop out of paid employment. U.K. mothers who take up full time employment can experience castigation for not "being there" for their children. Whether household earning behavior is influenced by fiscal, economic, or sociocultural factors, there exists distinct variation in child care practices by race, class, occupation, and region.

A second strand asks whether a shift away from gender role specialization to that of shared earning and multiple, often conflicting, roles fundamentally alters the balance of power in household decision making. Within this strand, particular attention has been paid to financial arrangements. Dual earning is shown to improve household income at all levels of earnings distribution. Data from the U.K. Equal Opportunities Commission indicate that 40% of women earn the same or more than their partner, and in the U.S., Levy and Michel observe that by the early 1990s one third of all the income of families with working wives came from their earnings. This leads to the question whether women who contribute an income from paid employment have greater bargaining power in key household decisions. Are they better able to resist being the "trailing spouse" in situations of migration for male spouse promotion? The research suggests that women who work full time in relatively high-status careers are better able to resist migration that is damaging to their employment, but the relationship between earnings and influence is not axiomatic. One alternative to the wholly moving household is dual-location living. This is used as a temporary or permanent strategy so that couples can live together some of the time while maintaining careers in different locations.

A third strand of research focuses on the effects that the rise of dual-earner households has on children, marital relations, and family life. While dual-earner households are "work rich," they are also "time poor." Families have gained the income women earn from paid employment but lost the time that they are available for unpaid caring and domestic services in the home. At the same time, very-low-income families are unable to improve their situation by becoming dual earners because of the cost (in cash and support terms) of child care. Understandably, there is concern in dual-earner households that less time is given over to the care of children and elderly relatives. Some researchers argue that maternal employment is damaging to children's emotional and behavioral development and consequently view the rise of dual-earner households as potentially harmful. Nevertheless, the popular image of "latch-key kids" and the erosion of family obligations can be exaggerated. Undermining notions of a growing care deficit are studies suggesting that parents spend more quality time with their children today, largely as a result of labor-saving technologies in the home.

Much is made of the need for dual-earner families to buy time through the purchase of goods and services. Yet census data show that private child care was purchased by just 55% of U.S. and 35% of British working families in 2000/2001. A significant proportion of dual-earner households manage child care informally, either by off-shifting spouse employment or relying on an army of unpaid "granny nannies." The continuing importance of family care in dual-earner families reflects not only the influence of parenting norms but also financial constraint. Affluent dual-earner households are in a position to purchase support services such as high-quality child care and domestic help. Yet their solutions to coordination problems rely on low-wage child care providers and cleaners for whom private child care is prohibitively expensive, even where they themselves form part of a dual earner of multijob household.

In fact, there is remarkably little difference in overall rates of market provisioning between single-earner and dual-earner families. This is because much social reproduction is performed as a "labor of love." Women no longer choose between work *or* family but instead manage the conflicting responsibilities of work *and* family. Mothers are consequently hardest hit by the time squeeze, widely observed to experience role strain carrying a dual burden of paid employment and unpaid domestic and caring work. Symptoms of physical, emotional, and marital stress are widely reported. Consequently, much dual-earner household scholarship is about attaining greater balance to life through greater recognition of the value of women's social reproduction work.

—Helen Jarvis

See also Marriage

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DYING

Although all people die, everyone's dying process is unique. Many people think of dying as merely a physical process, but dying is an experience of the whole person and is influenced by a combination of physical, psychological, social, cultural, and spiritual factors. There are as many ways to die as there are to live, so in order to better understand how people who are dying experience the process, researchers and clinicians have developed different models or theories that attempt to account for how people cope with dying.

THEORIES/MODELS OF DYING

Elisabeth Kübler-Ross's Stage Theory of Dying

The general public is most likely to be familiar with Kübler-Ross's theory of dying. In 1969, she published a book titled *On Death and Dying,* which was based on interviews collected from 200 dying patients. In the book, Kübler-Ross discerned five stages that dying people experience. The five stages, which reflect different reactions to dying, are denial, anger, bargaining, depression, and acceptance.

Denial is the "No, not me!" stage where the person is in shock or denial and cannot believe that they are going to die. Denial is self-protective and gives the person time to adjust psychologically to the news that he or she is going to die. Anger is the "Why me?" stage and may involve, in addition to anger, resentment, rage, and envy at God, doctors, nurses, family members, or anyone who is not dying. Bargaining is the "Yes me, but. . ." stage and often involves bargaining with God and attempts to postpone the inevitable ("Yes, I am going to die, but if only I could live long enough to see my child graduate," etc.). Depression involves mourning for current and past losses (reactive depression) and anticipated losses (preparatory depression and grief). Finally, acceptance emerges. Acceptance is not a happy stage, but rather is characterized by an absence of feeling, a giving up or resignation, or even a sense of peace that occurs as the person realizes that death is imminent and cannot be avoided. Although not a stage of dying, hope is an important aspect of all five stages and can persist throughout all of them.

In spite of its general popularity, Kübler-Ross's theory has been criticized on several points. Two of those criticisms are that there is really no evidence that stages are present in coping with death, and there is also no clear evidence that people who are dying actually move through the five stages that Kübler-Ross identified. Many people have also taken the stages as a prescription that dying persons must experience, rather than acknowledging that dying persons react and cope in different ways and may not want to or need to go through the five stages of dying.

Regardless of these criticisms and others, Kübler-Ross taught us important lessons about the dying process. First, she shed light on the much avoided topic of dying and was the catalyst for continued discussion and research on the issue. She also brought to light the challenges of dying and taught that dying people are still living and have needs and desires that need to be understood and supported throughout their dying process.

Task-Based Models of Dying

Task-based models of dying differ from Kübler-Ross's stage theory in several ways. First, they focus less exclusively on the ways that people cope emotionally with dying and instead take a more holistic approach by considering the ways that dying persons actively cope with a variety of potential challenges across numerous dimensions of life. They also do not explicitly or implicitly imply an order or sequence, which offers a more flexible, less prescriptive perspective from which to view the challenges of both dying patients and their loved ones.

Charles A. Corr's Task-Based Model of Dying

Charles Corr has presented one popular task-based model of dying that describes four areas of task work (physical, psychological, social, and spiritual) and basic types of tasks related to coping with dying in each of those areas. Corr identified two primary types of physical task work of dying persons: satisfying bodily needs and minimizing physical symptoms of distress in a manner personally acceptable to and consistent

with the dying person's values. Psychological task work includes striving to maximize psychological security, autonomy, and richness in living one's life until death. Social task work includes sustaining and enhancing both significant personal attachments and select societal interactions. Finally, spiritual task work involves the identification, development, and reaffirmation of one's meaning in life, connection to the source of spiritual energy, and ultimately, one's hope.

Corr's model is consistent with the premise presented at the beginning of this entry—that how a person experiences dying depends on a combination of physical, psychological, social, spiritual, and cultural factors.

PHYSICAL FACTORS IN DYING

The specific physical challenges associated with one's dying process depend on the characteristics of the disease from which one is dying. For example, presence and amount of pain, effects of medical treatment, medications used to treat the illness, rate of physical deterioration, and amount of loss of control all relate to the rate and ways in which one will experience the dying process.

Dying trajectory, a term coined by Barney G. Glaser and Anselm L. Strauss, describes the overall pattern of an individual's dying process with respect to shape and duration. Shape refers to the general course of the dying process (i.e., predictable/unpredictable and expected/unexpected), and duration refers to the length of time between onset of dying and the actual time of death. Four dying trajectories have been described and are presented below:

Downward slant: represented by a rapid decline toward death with little or no chronic phase of an illness

Gradual slant: represented by a long slow decline, perhaps lasting for years

Peaks and valleys: represented by alternating periods of decline/relapse and remission

Descending plateaus: represented by long, slow periods of decline followed by remission or restabilization

These general courses of physical decline influence the social and emotional response of the dying person and their loved ones. For example, although many people say their ideal death would be to die from a sudden heart attack, that type of death is shocking for the survivors and gives no time to prepare or say goodbye. On the other hand, prolonged dying processes can be financially and emotionally exhausting for everyone involved.

When a person is dying from a terminal illness and death is very near, within hours or days, the phase of active dying occurs. Physical changes that signal the phase of active dying include changes in breathing, incontinence (loss of bowel and bladder control), sweating, nausea and/or vomiting, decrease in appetite and thirst, loss of ability to swallow, change in skin color, increased periods of sleep, decreased consciousness, disorientation or confusion, restlessness or agitation, social withdrawal, and decreased ability to communicate.

PSYCHOLOGICAL/EMOTIONAL FACTORS IN DYING

Dying threatens one's emotional equilibrium, and intense, grief-related emotions can feel overwhelming. Fear, anxiety, sadness, depression, anger, hostility, helplessness, powerlessness, depression, guilt, and shame are some of the most common emotional reactions experienced by people who are dying. All of these emotions are normal, serve a purpose, and need to be allowed expression.

Denial is a common coping strategy that helps people to find internal strength and external support before confronting the implications of their diagnosis, prognosis, and impending death. Denial should not be judged as good or bad, but rather should be evaluated in terms of its helpfulness or interference in facilitating coping.

Anger and hostility are natural responses to having everything in one's life threatened and ultimately taken away. Common sources of anger are a sense of failure, poor communication, abandonment, pain, and the turn of events that will result in one's death. Anger can also be a "cover" for more vulnerable emotions such as fear, anxiety, hurt, helplessness, and disappointment.

Fear and anxiety can feel incapacitating to people who are dying. Some of the most common fears associated with the dying process include pain, abandonment/loneliness, indignity, the unknown, loss of control, separation from loved ones, meaninglessness, being a burden to others, the process of dying, and the afterlife. All of these fears can lead to both physical (e.g., tension and restlessness) and psychological (e.g., worry, apprehension) symptoms of anxiety.

Depression is a natural response to the perception of imminent loss among the dying, and while mild

depression is natural and adaptive, severe depression, which is rarer among the dying, can rob them of their remaining quality of life. Depression is often difficult to distinguish from preparatory grief, the normal dying process, and reaction to poorly controlled physical symptoms.

Helplessness and powerlessness are related to perceived loss of control. Although the natural dying process results in increased dependency, dying persons need to be offered control to the extent to which it is both desirable and possible. There are always possibilities for control of at least some facets of life.

Finally, many consequences of illness and dying can produce guilt and shame. People who are dying may experience patient responsibility guilt, for the deterioration of their health, moral guilt for having done something wrong to have caused their impending death, guilt for not responding to treatment, or guilt for causing their loved ones to suffer.

SOCIAL FACTORS IN DYING

People do not live or die in a social vacuum, but rather, in the context of family, friends, and community. Dying people want to maintain relationships with special people in their lives for as long as their physical and emotional energy allows. Additionally, they often need to complete unfinished business with loved ones, which may include saying goodbye, reconciling differences, gaining closure in relationships, or expressing regrets, forgiveness, and appreciation.

Communication facilitates the accomplishment of those tasks as well as the continuation of bonds with loved ones during the dying process. Yet, one of the greatest challenges facing many dying persons and their loved ones is finding a way to talk about important issues, including the dying person's diagnosis and prognosis, as well as feelings, thoughts, and questions related to life plans, dying, and death.

Awareness Contexts and Communication

Glaser and Strauss studied family interactions that occurred when a member was diagnosed with a life-threatening illness. They discerned four levels of awareness of dying that shape the communication styles within families and that can shift any time during the course of a life-threatening illness as the course of the disease progresses and medical interventions change.

The closed awareness context is characterized by the dying person not being aware that he or she is dying, but others being privy to that knowledge. Accordingly, there is little if any communication about the person's illness or impending death.

The suspected awareness context occurs when the dying person suspects that he or she is dying, but no one confirms those suspicions. However, the dying person senses a shared secrecy and experiences the emotions and strained communications of others, and so the suspicions are confirmed indirectly. Because others are not willing or able to communicate with the dying person, he or she is left to cope with the emotional process of dying alone, in social isolation.

In the mutual pretense context, both the dying person and others know that death is imminent, but none speak directly of the issue. Everyone knows that the person is dying, but they may all act as if everything is normal and the person will recover up until the moment of death because they cannot face the situation directly. Again, the dying person is left to cope with dying alone, without the benefit of a shared experience and social support.

Finally, in an open awareness context, both the dying person and others acknowledge and discuss the impending death. Shared social support is maximized when this awareness context dominates. An open awareness context does not necessarily assure an easier acceptance of the inevitability of death, but may provide for optimal support.

Many people value an open context of awareness and communication early in the dying person's disease process because they feel it may facilitate optimal completion of relational tasks. This is important, because as a dying person's life energy wanes, a gradual process of withdrawal typically occurs. There is a lack of interest in surroundings, current events, and, finally, a withdrawal from even close loved ones. The dying person becomes more inner directed and silence becomes more meaningful. However, social withdrawal and a turning inward should not be mistaken for a cessation of the need for love and connection. For most dying persons, valued relationships are vital until the time of death.

RELIGIOUS AND SPIRITUAL FACTORS IN DYING

For most dying persons, spirituality and/or religion provide support in coping with dying. Spirituality

involves a sense of connection to the universe and a higher power and the way that one makes sense out of life and death. Religion is an organized system of worship that gives structure to one's spiritual beliefs and relationship with a higher power. One or both may serve people while they cope with their dying process.

In addition to finding meaning in life, suffering, loss, and death, and feeling connected to a universal source of energy, a dying person's spirituality and religion also provide support in learning to give and receive selfless love and in finding hope. There is potential for significant growth and development at this time of a person's life, but there is also the possibility for despondency if the person who is dying feels that they have not lived a meaningful life and will not leave behind a positive legacy.

Maintaining hope is a universal challenge supported through one's spirituality and religion. Long after the hope for a cure is relinquished, people who are dying can remain hopeful. They can hope for peace, comfort, dignity, a good day, minimized loss of control, that loved ones will be able to manage without them, and living long enough to experience a cherished life event such as a family birth, marriage, or graduation.

Making the transition from living to dying is another task supported by a dying person's spirituality and/or religion. Religion provides an answer to the question of what happens after death, and having an acceptable answer can make the challenges of dying more tolerable.

The means by which dying people embrace their spirituality and/or religion and seek solace during the dying process vary across individuals, cultures, and religions. Some common forms of spiritual and religious connection include praying, attending religious services, reading spiritual or religious texts, connecting to nature, meditating, listening to spiritual music, focusing on spiritual objects (e.g., rosary, cross, altar), burning candles or incense, and being purified or anointed.

HOSPICE

The care that dying patients receive at the end of life should support them in completing the multifaceted tasks of dying. Traditional medicine is based on the Western medical model and focuses almost exclusively on curing diseases and providing medical treatments for one's physical body. It provides little or no support for the psychological, social, and spiritual dimensions of people who are dying. Hospice, on the other hand, offers holistic end-of-life care to dying persons and their families. The goal of hospice is to offer comfort, state-of-the-art pain control, symptom management, and loving care in an effort to reduce suffering so that dying persons can continue to live as fully as possible until their death.

Hospice is not institutionalized care but, rather, a community-based, comprehensive concept of care that is designed to address the physical, psychological, social, and spiritual needs of dying persons and their families. Care and support are provided during the dying process and may continue during the family's period of bereavement. Hospice care is provided 24 hours a day, 7 days a week, by an interdisciplinary team of professionals consisting of physicians, pharmacists, nurses, social workers, home health aides, physical and occupational therapists, and chaplains, as well as hospice volunteers, family, and friends.

Although most hospice care in the United States is provided in the dying person's home, the hospice philosophy and program of care can be provided for dying persons in any setting (e.g., hospital, nursing home, hospice residential facility) and in any part of the world. Although hospice care exists in some form on every continent of the world and in more than 100 countries, it is still greatly underutilized in many developing nations, as well as among minorities in the United States, who currently account for only about 5% to 8% of hospice patients. American minorities, who are more likely to have experienced neglect and inequities in health care than their White counterparts, are more likely to view hospice as medical abandonment versus compassionate care for the dying.

CULTURAL FACTORS IN DYING

In general, people from Western cultures are more death denying and death avoiding than either people from Eastern cultures or ethnic groups within the United States. However, although White Americans are generally death avoidant, they place a high value on patient autonomy, open communication between physician and patient, and the dying individual as primary decision maker during the dying process. These values are consistent with Western medicine and White culture, but there are many people in the United States and abroad for whom these values do not pertain. Ethnic and religious minorities are considered to be more death affirming, but patient autonomy and open communication may not be highly valued.

Cultural and ethnic differences in dying must be considered because dying is a sociocultural event and one's identity as a member of a culture influences the dying process and its impact on the individual and the family. Even when people have not maintained close connections to their culture's traditions, they often identify very strongly with their cultural backgrounds during a life crisis such as dying.

Native Americans

Although each tribe, clan, and nation is unique, in general, Native Americans view life and death holistically and the mind, body, heart, and spirit are interconnected with each other and all other things. This philosophy is consistent with their strong desire to meet death with dignity, since dying and death are believed to be part of a natural cycle. Additionally, most Native Americans are deeply connected to the Creator and believe that the spirit continues to live on after death. This belief influences one's response to dying and is consistent with the saying that "today is a good day to die."

When a person is dying, the extended family provides care with the support of the entire community. It has been noted that although formal hospice services are not often utilized by Native Americans, they have been using a hospice approach for hundreds of years in their communities. Many elders prefer traditional tribal medicine to that of Western medicine, and it is not uncommon for Native Americans of all ages to refuse medical procedures or treatments without having first seen the tribal medicine man/woman. They may also visit sweat lodges for purification and use sage, cedar, or grasses in healing rituals meant to return strength and balance to the heart, soul, mind, and body.

Although there are some similarities in worldview across nations or tribes, some specific beliefs, attitudes, and behaviors related to illness, dying, and death also vary. For example, while most Native American tribes believe in a continuation of life in another world following death, the Navajo do not. The Apache consider the body to be an empty shell, whereas the Lakota regard the body as sacred. The Lakota also prefer to have loved ones die at home rather than in a hospital, whereas the Navajo bring their dying to the hospital to protect the home from pollution.

Hispanic Americans

The terms *Hispanic* and *Latino* apply to diverse groups of people from more than 17 Spanish-speaking countries, including Mexico, Puerto Rico, Argentina, Cuba, and Peru, among others. Because Mexican Americans represent the largest Hispanic group living in the United States, they will be the focus of this discussion.

"Family-first" characterizes Mexican-American life. Accordingly, dying is a family affair and both nuclear and extended family members provide a strong supportive network for the dying person. A family-centered style of medical decision making is common, and the eldest male often has final authority over medical decisions. Families generally want to be told medical information about the dying person's condition first and will then decide if and by whom the news will be conveyed. Some Mexican Americans believe an open discussion of death will cause a loss of hope and disease acceleration, in which case medical information may be withheld from the family member who is dying.

Mexican Americans utilize hospice services less than any other group in the United States and rely on family to provide care for the dying person at home as long as possible. Some traditional Mexican-American families rely on *curandurismo* (folk healing), although this is not a universal practice. If hospitalization becomes necessary, family members maintain a bedside vigil so that the person is comforted and does not die in isolation.

The role that religion and spirituality plays in the life of Mexican Americans is deeply embedded in centuries of cultural rituals and practices. Mexican Americans adhere to fatalism and view death as inevitable, the result of fate or the will of God; and pain and suffering are seen as a test of one's faith. One's spirit must be considered in all health care situations, including the dying process. Many Mexican Americans are Catholic, and religious symbols (such as rosaries, holy water, candles with pictures of Saints, medals, and prayer cards) and practices (such as prayer, Novenas, and anointing the dying person with holy water for the last rites or sacrament of the sick) provide support throughout the dying process.

Black Americans

Like Hispanics, Black Americans comprise a diverse population, including immigrants from the Caribbean Islands and countries in Africa. In spite of such diversity, religion and church are generally integral sources of support for Blacks, who are primarily Christians, but also Muslims and members of other

faiths. Regardless of the specific religion or denomination, Blacks are generally death accepting, and religion and spirituality form the foundation of efforts to cope with illness and dying.

Church attendance, prayer, spirituality, and assistance from pastors, ministers, other religious leaders, church members, and extended family and kinship networks provide support to families during the dying process. Formal caregiver services are infrequently utilized during the dying process because of a strong sense of family responsibility, a desire for kin to provide home-based care for loved ones, and a well-documented, heightened mistrust of the medical community based on years of medical care disparities across race and ethnicity. Hospice care is often not utilized for the reasons above and because of a lack of knowledge about their services, the inability to identify with providers who are predominantly White, and the perception that to enlist hospice support is to go against God's will by giving up hope. More than any other group, Blacks also want more aggressive, life-extending treatment during terminal illness.

Asian Americans

Among Asian Americans, illness and death are viewed as fate, and medical intervention may be resisted for fear that it may interfere with one's spirit. However, use of acupuncture, acupressure, coin-rubbing (to draw out the illness from the body), and herbal remedies are common practices. Many Asian Americans believe in reincarnation; therefore, death is viewed as a transition into some other life, rather than the end of life, and consequently is not feared.

Many families of Korean, Chinese, and Japanese descent prefer that terminally ill and dying family members receive care in the hospital, and traditional Chinese-American and Japanese-American families maintain bedside vigils and minister to the dying person's needs, while medical personnel provide technical medical care. In Korean and Japanese families, the family, rather than the dying person, is told the news of the terminal nature of the illness, and the eldest son makes medical decisions regarding the dying person's treatment and care. Chinese Americans are more likely to prefer that the ill or dying person be given the diagnosis first, and then that person, rather than the physician, tells others. Vietnamese-American families prefer their loved ones to die at home, and the person who should be told about the terminal medical condition depends on who is believed to be the strongest. In traditional Chinese family structure, if a parent is sick or dying, the sons will provide care at the bedside, rather than daughters.

Religion, Culture, and Dying

Although one's culture influences one's response to dying and death, religion is the mainstay of many cultural groups. Thus, any particular response to dying may vary within a culture, depending on a particular person's religious beliefs and customs. India provides a good example to illustrate this point, because in India people are Hindus, Buddhists, Muslims, and Christians, and each religion and every region has its own traditions and beliefs related to death and dying. Although a comprehensive account of those traditions is beyond the scope of this entry, several examples of the characteristics of the non-Christian religions will be highlighted.

Even though the Hindu culture is death affirming, it is customary to purify the home and those who have contact with the dead body before engaging in any other activities. In South India, among Hindus, when death is anticipated, the family members move the person who is dying to the patio or to the front yard so that the soul does not become entrapped in the house when death occurs. During this period, loved ones usually stay with the dying person until their last breath. Holy water from the river Ganga is placed in the person's mouth to purify the body and the soul as the person takes the last breath.

The concept of "good death" is very prevalent in Hindu cultures. It is believed that if one lives life to the fullest and does good while alive, the person usually has a good death. Karma, or a person's deeds in life, determines what the end is going to be, and this belief becomes a guiding principle to live life accordingly. Hindus also believe in reincarnation or rebirth depending on what a person did in his or her life. If a person has lived a righteous life, the person is reborn as a higher being. Conversely, if the person has not lived a good life, the person is reborn as a menial creature. For Buddhists and for Hindus, life on earth becomes a transitional phase between reincarnations. Death, in fact, challenges people to live their lives better.

Muslims consider illness, especially of a terminal nature, as atonement for one's sins or wrong doings. Although death is believed to be a part of the journey to meet the creator, Muslims emphasize the sacredness of

life and need to prolong life. In Islam, when a person is dying, the head of the person is turned towards Mecca (i.e., east-south-east). The immediate family usually stays by the bedside of the person who is dying and makes sure that the person is comfortable.

SUMMARY

Dying is a natural life passage, as much a part of our life cycle as being born, entering puberty, or becoming an adult. If a dying person's whole self is supported within a cultural context, there is significant opportunity for continued growth and development during the last stage of life.

—Brenda Moretta Guerrero and Lavina M. Noronha

See also Death, Death with Dignity

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DYNAMICAL SYSTEMS

Dynamical systems theory is a relatively new framework within which virtually any area of inquiry can be conceptualized. In what follows, this framework is applied first to ecosystems and then to human development. The examination of ecosystems will illustrate some important properties of dynamical systems, properties that apply as well to human development. Human development will be examined across two scales of time: a large scale embracing evolution of the human species over millennia, and a short scale embracing the life span of individual humans.

DYNAMICAL SYSTEMS THEORY

General Properties of Dynamical Systems

Much of Western science attempts to understand systems by analyzing them into their parts. By contrast, the dynamical systems approach looks at the whole system. The approach is holistic rather than reductionistic. The idea behind this approach is that the essence of a system may be an emergent phenomenon that cannot be found in the parts. Because of emergent phenomena, the whole is often greater than the sum of the parts. Liquidity and the life-sustaining properties of water cannot be found in the hydrogen and oxygen molecules of which it is composed. Human consciousness, personality, wit, and charm are evident in a whole person but cannot be found in any of her or his parts. A living, breathing person is an emergent phenomenon of a vast sea of interacting internal and external webs of relationships.

Dynamical systems theory views reality, including the entire universe, as composed of coevolving webs or patterns of relationships rather than of static, discrete entities or things. A system is what it is only in relation to other systems. For example, the human body is made up of hierarchically organized and interacting networks of cells, tissues, organs, and physiological systems, none of which can function independently of the others. Furthermore, any given person is embedded in much larger sets of relationships, including families, communities, ecosystems, and the entire planet Earth. A distinction may be drawn between two arrows of time: the positive and negative arrows. The positive arrow reflects the buildup or development of systems, and the

negative arrow reflects their eventual breakdown or death in accord with the second law of thermodynamics. A nascent system may grow and complexify away from thermodynamic equilibrium, but it will inevitably succumb to the second law and disintegrate. Thus, the life trajectory of a system tends to describe an inverted U. For example, the human body starts off as a single cell very near equilibrium, grows into a complex person composed of billions of interacting webs of cells (e.g., tissues and organs) with various emergent properties, and eventually deteriorates and dies. The development of a system across the positive arrow of time is self-organizing because it is not designed or guided by an external agent or blueprint. This self-organizing development is usually characterized by a series of phase transitions from one basin of attraction, or attractor, to another.

Systems in attractors are self-perpetuating; they behave as though they want to come to rest and conserve energy. When a system is in an attractor, it is relatively stable and predictable. However, systems are in constant, though sometimes imperceptible, change; they are perturbed from time to time by effects that reverberate across the multiple webs of which they are composed and in which they are embedded. When these perturbations are sufficiently strong, systems are forced to change, or undergo phase transitions, into new attractors. Thus, across a normal life span, a person develops across such attractors as infancy, childhood, puberty, young adulthood, various phases of formal education and training, career changes, marriage, divorce, and retirement.

The stability of systems in attractors is more apparent than real because systems are constantly renewing or reconstructing themselves. Living cells are never the same from one moment to the next because there is a constant turnover in the molecules of which they are composed. A human face is recognizable year after year even though it is always being reconstituted by different cells and tissues. Thus, the overall pattern of relationships defining a system can appear stable even though it is constantly being reconstructed or regenerated. The continual renewal of the patterns of relationships defining a system serves to keep it alive (e.g., away from thermodynamic equilibrium). Still, given enough time, the pattern itself is bound to change.

Natural systems tend to participate in coevolving relationships in which changes in any one can effect changes in the others with which it is connected. Thus, environmental changes can lead to evolutionary changes in organisms, and those changes can, in turn, lead to environmental changes in an ongoing spiral of coevolution. This coevolutionary relationship between organisms and their habitats, or niches, has been referred to as niche construction. In addition, most natural systems are likely to exemplify deterministic chaos. Because of the constant reverberations across the webs of which any given system is composed and in which it is embedded, its life trajectory is usually inherently unpredictable. A defining feature of a chaotic system is its extreme sensitivity to initial conditions. The tiniest of changes in start-up conditions of a nascent system can send its life trajectory off into vastly different directions. Indeed, the tiniest of changes in the conditions the system encounters anywhere along its life trajectory can divert it off into drastically different fates. A simple virus can invade a human body and cause its demise. These tiny effects are referred to as butterfly effects.

The Edge of Chaos, Fitness Landscapes, and System Diversity

Stuart Kauffman suggests that systems reside in attractors at varying distances from a hypothetical edge between order and chaos. Systems near the edge are in shallow attractors and are easily perturbed into new attractors. They are not well adapted to their ecological niches, but they are relatively flexible and able to change with a changing environment. Systems in the ordered regime far from the edge reside in deeper attractors and are more stable (in the dynamical sense). They are better adapted to their current niches, but they are also more rigid and less able to change if their environments are perturbed.

Another way that Kauffman expresses this same idea is in terms of fitness landscapes. This landscape is composed of various peaks and valleys. The peaks represent different habitats or niches and those characteristics of organisms that are maximally suited or adapted to those habitats. Biological evolution tends to move organisms up the peaks. Different species make it to the tops of different peaks. They are specialists that tend to dominate their particular ecosystems. Other species are scattered across the slopes of different peaks. They are generalists that are able to eke out a living in different ecosystems but are not particularly well adapted to any one of them. The specialists are in deep attractors far from the edge of chaos, and the generalists are in more shallow attractors

nearer to the edge. The specialists residing atop the peaks have the advantage as long as the landscape remains unchanged. However, the landscape is itself a vast web or system that will itself be perturbed into phase transitions from time to time as a result of such things as global weather changes, earthquakes, floods, and the invasion of new species from remote ecosystems. When the landscape is sufficiently perturbed, the more flexible generalists will be better able to adapt to the changes and will be able to outpace the more rigid specialists to the tops of the new peaks.

Diversity, whether of species in an ecosystem, baskets of eggs, or stocks in a portfolio, render systems hardy and robust. Complex systems far from equilibrium are less vulnerable to collapse than simple systems close to equilibrium. However, if systems become too complex, then the tables can turn. One tiny perturbation, like a virus in a human body or the addition of one more card to a house of cards, can cause the whole system to collapse. This vulnerability of systems at a threshold level of complexity has been referred to as self-organized criticality.

THE DYNAMICS OF NATURAL SYSTEMS

Nature affords many examples of dynamical systems. Indeed, all of nature may be considered a vast web of coevolving dynamical systems. For example, a dynamical web of relationships is evident in different species of organisms, such as predators and their prey. Richard Dawkins highlights the example of the coevolution of cheetahs and gazelles. For many millennia, the survival of cheetahs has depended on their ability to hunt gazelles and the survival of gazelles has depended on their ability to elude cheetahs. The evolution of greater hunting skills in cheetahs prompted the evolution of greater elusiveness in gazelles and vice versa. This coevolutionary relationship has been necessary for the survival of both species. If the hunting skills of cheetahs were not counteracted by the escape skills of gazelles, then all of the gazelles would soon be gone and cheetahs would starve to death. Likewise, if the elusiveness of gazelles outweighed the hunting prowess of cheetahs, then the cheetahs would die off, leaving the gazelles to overpopulate, consume all of their food resources, and eventually starve to death. Cheetahs and gazelles are what they are in relation to one another (as well as many other systems).

As noted above with respect to niche construction, organisms change with their environments, and environments change with the organisms that inhabit them. Organisms and habitats are what they are in relation to one another. One of the most striking examples of the cyclical, coevolutionary relationship between organisms and environments is what has been referred to as the "oxygen holocaust." For most (about four fifths) of its history, life on earth was invisible, consisting only of bacteria. The metabolic processes of the first bacteria released an abundance of oxygen into the atmosphere. Oxygen is a harsh, corrosive gas, and when too much of it accumulated in the air, the bacteria that produced it began to die off. This oxygen holocaust led to a phase transition in the bacteria. Their metabolic processes evolved to not only withstand oxygen, but to exploit it. Our dependence on oxygen today is testimony to this great transition. So the bacteria changed the environment, which, in turn, changed the bacteria.

The periodic turnover in the diverse species that compose healthy ecosystems exemplifies dynamical stasis in ecosystems. Just as the pattern defining a human face can remain constant despite the constant turnover of the cells that compose it, so the overall features of an ecosystem can remain constant despite a turnover in the species that compose it. The finches of the Galapagos Islands afford another example of dynamical stasis in nature. These islands are inhabited by several species of finches that are differentiated by, among other things, the sizes and shapes of their beaks. Different species are specialized for the consumption of seeds of different sizes. When the climate is moderate, all species of finch may inhabit the islands. However, the climate on the islands can change drastically from year to year and decade to decade, ranging from long droughts to constant rain. As the climate changes, so do the vegetation and the relative abundance of different seeds. When particular seeds vanish, so do the finches that depend on them. Natural selection favors the finches whose beaks are appropriate for the available seeds. Thus, from year to year, different species of finch may dominate the islands. When the climate and vegetation return to a former state, a vanquished species of finch may be resurrected. Thus, over longer spans of time, all species of both plants and finches are represented, so that there is a dynamical stability to the overall pattern and diversity of the ecosystem.

Perturbations like the changing climates of the Galapagos can be beneficial to ecosystems. Research by Reice affirms the value of perturbations in keeping

natural systems robust and alive. Ecosystems that are regularly perturbed by such natural phenomena as floods or fires tend to be rich in species, hardy, flexible, and capable of "rolling with the punches." Ecosystems that are not regularly perturbed tend to be dominated by a few specialist species. They are mired in deep, rigid attractors far from the edge of chaos and are subject to stagnation and death. When healthy ecosystems do recover from perturbations, there is often a change in the species that compose them. The previously dominant species are the least likely to survive the perturbations. Their niches tend to be taken over by previously subordinate species or immigrants from nearby ecosystems. The turnover of species injects "new blood" into the ecosystem and prevents a dominant species from taking over the whole ecosystem and rendering it vulnerable to stagnation. Again, the ecosystem exhibits dynamic stasis; the inhabitants change, but the overall pattern is retained.

Thus, both whole ecosystems and individual species display many of the features of dynamical systems. Ecosystems that are too stable and too homogeneous are the most vulnerable to the negative arrow of time. Likewise, specialist species that reside atop fitness peaks and dominate ecosystems are the least likely to survive when the fitness landscape is altered by perturbations. Healthy ecosystems and species tend to be those that live relatively close to the edge of chaos and on the slopes rather than the tops of fitness peaks. The idea of fitness landscapes has recently been empirically verified in laboratory studies of bacteria. Cultures of bacteria are allowed to evolve in a particular environmental medium. Some become much better adapted to this medium than others. Those that achieve peak fitness are the specialists that tend to dominate the medium. But when the medium is systematically altered, the specialists falter and the previously subordinate generalists take over. As noted above, this ability of generalists to adapt to new fitness landscapes has been observed in the species of plants that inhabit perturbed ecosystems.

Although complexity and diversity of species in ecosystems generally serve their survival and longevity, they do not render them completely immune to self-organized criticality and fatal butterfly effects. The integrity of complex ecosystems often depends on one or two keystone species. If these keystone species are removed, then the whole system can collapse. In nature, this collapse is often due to the invasions of non-native species. Several invading species from Europe and Asia, such as cheatgrass, tiger mosquitoes, and zebra mussels, have wreaked havoc on ecosystems in the United States. The integrity of ecosystems also depends on the integrity of their connections to other systems. Ecosystems that become fragmented into isolated patches, disconnected from the webs of relationships to other ecosystems with which they have coevolved tend to stagnate and succumb to the negative arrow of time. Some of the sources of fragmentation are geological, such as earthquakes, and others are human based (e.g., freeways, cities, and farms).

The Dynamics of Human Development

The dynamical framework and its application to natural systems provide a new perspective on human development. We look first at the development, or evolution, of human culture over millennia and then at the life span development of individual humans.

EVOLUTION OF THE HUMAN MIND

The Descent of Humankind

Life on earth has self-organized across many major phase transitions. Nucleated bacteria evolved from non-nucleated bacteria, multicellular organisms evolved from bacteria, and various plant and animal species came and went across various mass extinctions. A global perturbation in the form of a giant meteor is believed to have produced the last mass extinction, the one that led to the demise of the dinosaurs and the evolution of diverse mammals. Thus, as is characteristic of perturbed fitness landscapes, the dominant, specialist species were replaced by the subordinate, generalist species. Then, just a few million years ago in a perturbed, tumultuous landscape in east Africa, a new species of primate, a bipedal generalist, was able to exploit new ways of making a living (e.g., in both jungle and savanna).

Various butterfly effects were involved in human evolution. For example, the upright stance of the first hominids produced a repositioning of the trachea and a more restricted birth canal. The former permitted greater vocal articulation and, a few million years later, the evolution of complex language. The latter required that the babies be born "prematurely" (in comparison with their primate cousins). This meant that brain development continued comparatively long after birth and could be more specifically attuned to

the particular environments in which the babies were reared. Across the millennia, hominids self-organized across various phase transitions involving, among other things, a growth in brain size. Eventually, just a few hundred thousand years ago, anatomically modern humans appeared on the landscape and the remnants of other, more "primitive" humans disappeared.

Jared Diamond suggests that for the bulk of our history, we anatomically modern humans were not particularly remarkable. Our ancestors roamed in small, kinship-based groups, much like other primates. Then, about 40,000 years ago, the first of two grand phase transitions, the upper-Paleolithic revolution, moved us into a new attractor. Our minds underwent a dramatic transition; we became self-reflective, symbolic thinkers. Our potential for complex language was finally realized, and we began to express ourselves on cave walls and invent and make use of a wide variety of tools, weapons, and body ornaments. We continued to follow the hunter/gatherer lifestyle of our hominid ancestors and primate cousins, although we did so with much greater efficiency. Then, only about 8,000 years ago, we stumbled onto an area in the Middle East known as the "fertile crescent" and underwent the second grand transition in our minds and behavior, the Neolithic revolution. We gave up our tried-and-true hunter/gatherer, kinship-based lifestyle and began to settle down in larger, agrarian-based communities. From then to now, cultural and technological evolution has transformed the human mind and the entire web of life on earth.

Three Natures

It is helpful to distinguish between three basic forms of nature. First nature is material; the whole universe is a web of basic particles and energy. It was the only nature around for most of the 12- to 15-billion-year history of the universe. Second nature is biological. Life appeared on earth some 4 billion years ago. Third nature is ideological. Through the medium of the human mind, it made its appearance with the upper-Paleolithic and Neolithic revolutions. The emergence of first nature from the big bang, of second nature from first nature, and of third nature from first and second natures may be considered the most powerful phase transitions of the entire self-organizing history of the universe. Planet Earth was formed by first nature processes and then massively transformed first by second nature and then, just a split second ago in geological time, by third nature. We contemporary humans are a composite of all three natures. We are material, biological, and cultural beings. Let us consider in more detail how third nature has transformed the earth and the human mind.

The Evolution of Third Nature

When humans settled down in communities, the kinship-based clans and social order gave way to a nascent and rapidly growing institutional order composed of various institutions such as polity, religion, law, military, technology, and economy. New ways of making a living emerged, such as politician, priest, policeman, soldier, craftsman, and merchant. Third nature and the institutional order were fueled by the ideas of anthropocentrism and progress, the ideas that humans were a privileged species, capable of and entitled to the ownership and harnessing of the rest of nature.

Prior to the rise of third nature, individual humans were generalists. Everyone knew virtually all there was to know (e.g., about hunting, gathering, and social customs), although some were no doubt more competent than others. However, as the third nature continued to evolve and self-organize, it began to dramatically alter the fitness landscape for humans. People began to be subdivided into the rapidly diversifying niches that defined the institutional order. The third nature landscape has been dynamical and volatile from the start. Those who rise to the tops of the peaks may become marooned in obsolete professional attractors, unable to keep pace with the changing landscape.

Technology and global crises are coevolving systems. Since upper-Paleolithic times, technological innovations by humans have steadily multiplied. The habitats of humans are no longer the living ecosystems of first and second nature. Instead, they are composed primarily of the technological artifacts of third nature. According to Jared Diamond, necessity may be more often the "daughter" than the "mother" of invention. The automobile was a novelty when it was first invented but has now become a necessity in much of the world. The same may be said of television, cell phones, and microwave ovens, among other technological "necessities."

Most of the "big problems" facing humanity and the rest of the planet today have coevolved with third nature. These problems include overpopulation, environmental degradation, fragmentation of ecosystems, loss of species, and, perhaps, impoverishment of the

human mind. Many of the normal checks and balances of first and second natures that kept the human population under control for millions of years have been diminished by the technological innovations of third nature. For example, if synthetic fertilizer had not been invented some 70 years ago, then the earth would not have been able to sustain the mushrooming human population. Still, the unchecked spread of humanity is taking a severe toll on the earth and its resources. This is especially true of the United States. According to E. O. Wilson, if the entire human population consumed at the same rate as the United States, then the equivalent of four earths would be required to sustain it. Our soaring population and its technological artifacts have led to global warming, the extinction of species of up to 1,000 times the base rate, and countless other global crises.

We may wonder if the dynamics of ecosystems apply to third nature and the human species. Is third nature transforming the entire earth and propelling it into a massive phase transition with unforeseeable consequences? Is third nature so complex that it is near the threshold of self-organized criticality and on the brink of collapse? Are humans the most destructive invading species of them all? Has the human population become so dominant and the diversity of species so diminished that the whole earth is stagnating? Is the human mind itself a casualty of third nature?

The Transformation of the Human Mind

The human mind, like other natural systems, may have been altered by the evolution of third nature. The webs of relationships in which the human is embedded and by which it is defined have been dramatically altered. Whereas we were once connected to and participants in the ecosystems of first and second natures, we now are embedded in and defined by the webs of third nature. In Western cultures, human habitats are technologically crafted. We live in large, electrically powered homes furnished with the latest technological appliances. We spend most of our waking hours connected to televisions, computers, cell phones, and other artifacts of third nature.

Third nature may have co-opted the human mind in the course of its own self-perpetuating dynamics. Our processes of perception, attention, memory, emotion, and learning are all heavily influenced by third nature. Third nature has infused the human mind with the ideas of progress and anthropocentrism, ideas that have fueled the evolution of third nature from the beginning. The human mind is the medium by which third nature and the institutional order self-perpetuate. Third nature originally arose from the human mind but now controls and defines it. To understand how this may be so, let us now consider the development of individual humans.

Development of Individual Humans

are in relation to the institutional order and other aspects of third nature. We have been shaped and sustained by the dynamics of third nature. Third nature governs our thoughts, our foci of attention, our perceptions, our passions, and our self-concepts. Of course, we still have second nature genes and motivations (e.g., to procreate and develop kinship bonds), but even these have been co-opted by self-perpetuating institutions of third nature (e.g., the fashion, pharmaceutical, and entertainment industries).

When the third nature landscape changes, as it is bound to do from time to time, and our realms of expertise are revised or replaced by new ones, we may no longer have the flexibility to adapt to the changes. In virtually all professions, or institutional niches, there is a steady turnover in the specialists, the "dominant species." What happens to us when we are no longer vital participants in the institutional order? Is there anything we can do to forestall and abate the negative arrow of time? Are we doomed to be marooned in obsolete attractors and suffer a rapid cognitive decline? Is there nothing of or in us that has not been cultivated and defined by third nature? Can we not fight back?

What the Future May Hold

The human mind will continue to coevolve with all three natures. Because we are immersed in a complex, chaotic web of relationships with the rest of nature, it is not possible to predict what our futures may hold, both for humanity as a whole and for each of us as individuals. However, if we wish to shape our futures in ways that may benefit ourselves and the earth as a whole, then there may be valuable lessons we can learn from the dynamics of ecosystems. Let us first list five of these lessons and then see how they may apply to both the coevolution of third nature and the human mind and the life span development of individual humans.

Lesson 1. The robustness of a system depends on the diversity of its participants. A system dominated by too few participants tends to stagnate and not recover from major disturbances.

Lesson 2. In healthy, fluid systems that are continually recovering from disturbances, the more subordinate, generalist participants are more likely than the dominant, specialist participants to survive major disturbances.

Lesson 3. Systems that become fragmented and isolated from other systems in the broader webs of life or that remain too long in the same, deepening attractors too far from the edge of chaos lose plasticity and become vulnerable to the negative arrow of time.

Lesson 4. As the oxygen holocaust illustrates, "what goes around comes around."

Lesson 5. Change is constant. Systems that fail to grow along the positive arrow of time will deteriorate along the negative arrow of time.

Our Collective and Individual Futures

Compared to first and second natures, third nature is still in its infancy and may be suffering growing pains. If it is to survive and continue along the positive arrow of time, then it must heed all five lessons. If third nature continues to kill off the species-rich ecosystems of the earth and fill the vacant niches with a mushrooming human population and artifacts of the institutional order, then it is likely to sever its own lifelines and quicken its own demise. We can only hope that third nature will remain sufficiently flexible so it will be able to adapt and achieve a healthier balance with the rest of nature when the perturbations that it launches travel full circle and come back to haunt it.

Because the human mind is the medium through which third nature survives, the human mind will be either a casualty or a beneficiary of the future of third nature. Will third nature revise the idea of progress to embrace the earth as a whole? Will third nature revive and restore the rest of nature, our sensitivity to it, and our appreciation of it? Or will it continue to replace the first- and second-nature systems with its own artifacts and institutions? Will third nature completely co-opt, define, and control the human mind? Only the arrows of time will tell.

As individuals, there may be little we can do to alter the fate of third nature, but we may be able to apply all five of the above lessons to our individual lives. We may heed lessons 1 and 2 by fostering mental diversity and resisting the temptation to become too specialized. We may heed lesson 3 by reducing our connections with the artifacts of third nature and rebuilding our connections with our first and second nature roots. Otherwise, we may risk becoming isolated in deep, third nature attractors. If we allow ourselves to be totally defined by third nature, then what third nature does to itself, it will do to us (lesson 4). This does not mean that we should disconnect from third nature, but only that we might achieve a more balanced relationship with all three natures. Finally, we may heed lesson

5 by welcoming, even promoting, self-change. One's self identity does not remain constant across contexts and time. The self is an emergent phenomenon that is shaped by the dynamical webs in which it is embedded. Like any other system, it may self-organize across various transitions. A diverse, flexible self, like a robust ecosystem, can survive perturbations and flourish.

—William A. Johnston

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DYSLEXIA

Dyslexia is a controversial term most often used to describe learners who fail to learn to read quickly, easily, or well, despite exposure to instruction. Historically, dyslexia was understood to be a permanent cognitive deficit, sometimes described as brain damage, minimal brain dysfunction, or congenital word blindness. Currently dyslexia is seen as a specific learning disability, a label that allows students to receive special education services. Parents and teachers sometimes employ the term casually when a student struggles with reading. Intriguing emerging research is demonstrating, however, that most children with reading delays are not brain damaged nor do they have ineradicable reading disabilities. Instead, compelling meta-analytic reading research studies are showing that most young learners with normal intelligence and motivation can learn to read given enough of the right kind of beginning reading instruction, specifically, systematic instruction in phonemic awareness and phonics. Dyslexia, therefore, in most cases, is properly viewed not as an immutable, pathological brain disorder, but as a reading delay that can be overcome with appropriate instruction. Depending on the expert, the study, and the assessment tools utilized, the estimated incidence of dyslexia ranges from 1% to 20% in the general population and from 40% to 70% of adults in the prison population. Adolescents and adults with persistent difficulty in reading seem to have extreme processing problems and are the most resistant to treatment.

SPECIFIC SKILL DEFICITS AND INSTRUCTIONAL NEEDS

Delayed readers commonly demonstrate core problems with both phonemic awareness (auditory discrimination of the individual sounds in spoken words) and phonics (sound/symbol correspondences). Typically, a poor reader will hear a spoken word, such as *cat*, as a single sound and will lack the awareness that it is, in fact, composed of three individual sounds (or phonemes): /k/ /a/ /t/. Unfortunately, when learners lack phonemic awareness skills (including sound segmentation, rhyming, oral blending, and other skills), they are unlikely to benefit from formal reading instruction. Teachers in prekindergarten, kindergarten, and grades 1 and 2, and teachers of children with reading delays, should teach phonemic awareness through word play, sound-tapping activities, syllable analysis games, rhyming activities, and the use of alliterative stories, poems, chants, and songs. Students with dyslexia generally require additional practice to master phonemic awareness skills. Behavioral and genetic studies suggest that the tendency to have phonological deficits is heritable.

In addition to deficits in phonemic awareness, dyslexics typically demonstrate catastrophically inadequate knowledge of phonics. Instead of sounding out words, dyslexics memorize words as a whole and guess at meanings from pictures or contextual clues. The most effective method of reading instruction, especially for children with dyslexia, is direct instruction in phonics, not implicit, or discovery methods. Primary grade teachers and reading specialists are advised to provide explicit, sequential, multisensory, fun phonics instruction based on assessment of student needs. Dictation activities, responsive student vocalization, related readings in decodable text, and an encouraging setting are recommended. Phonics experts suggest that phonics instruction be tailored and delivered to homogeneous, not heterogeneous, achievement groups in order to match instructional content to the needs of the learners. Phonemic awareness and phonics lessons are not to constitute the totality of a literacy program, of course. These vital foci are to be integrated with rich exposure to shared literature to develop student motivation, writing practice, and lessons to develop fluency, vocabulary growth, and reading comprehension.

EARLY INTERVENTION AND TUTORING

Learners with dyslexia are most likely to acquire crucial reading skills if they are identified by the beginning of first grade and receive carefully tailored, sequential instruction, especially small group instruction, individualized instruction, or tutoring in phonemic awareness and phonics. Most school district contracts require classroom teachers to provide appropriate reading instruction for all members of their classes. In practice, though, lagging readers often do not receive individualized instruction from their regular classroom teachers. Some schools require a child failing at reading to repeat a grade. If that strategy fails, the child might be referred for special education. Regrettably, few regular education teachers have the time, training, or resources to provide special lessons for students who lag significantly behind their classmates. Many dyslexics are promoted each year, experiencing frustration and failure as they attempt to follow along with reading instruction, which is increasingly beyond their achievement level. Some elementary schools departmentalize during reading time to enable teachers to meet more efficiently the needs of diverse levels of learners. Intervention services can be provided by recruiting and training members of the community: retired people, high school or university volunteers, paraprofessionals, student teachers, cross-age tutors, parents, or other relatives. Properly selected computer software programs can also provide effective practice in developing phonemic awareness, phonics, and other beginning reading skills. All readers, but especially older delayed readers, need high-interest decodable text in order to practice their emerging reading skills. If students with dyslexia do not encounter targeted, systematic phonemic awareness and phonics instruction in the early years, they tend to fall farther behind academically and often require special education services. They can experience lifelong deficits in achievement and self-esteem.

BRAIN RESEARCH AND DYSLEXIA

Exciting new brain studies using noninvasive functional magnetic resonance imaging (fMRI) allow reading researchers to measure and record the levels of blood oxygenation in the areas of active brain tissue during the process of reading. Dyslexics have been shown to demonstrate a neural signature or pattern of brain activity in the front of the brain, with some inefficient compensatory activation in other areas, while nonimpaired readers show activation patterns mainly in the back of the left side of the brain, in the temporoparietal cortex, where the brain analyzes phonological information and processes words for instant recognition. In addition, the latest fMRI studies demonstrate how phonemic awareness and phonics instruction create new neural pathways and actual modifications in dyslexics' brain functioning, while the lack of appropriate instruction seems to cause a deficiency of localized brain functioning and poor reading skill attainment. We now know that students with dyslexia can develop left-side neural networks following effective reading intervention. This line of research shows clearly that targeted instruction works, that the brains of young children with dyslexia can essentially be rewired to function like those of good readers. The fMRI studies indicate that reading problems occur equally among girls and boys, even though boys are more likely to be identified in school, possibly because they are more likely to exhibit behavior that conflicts with social norms.

THE LETTER REVERSAL MYTH

It is a common misconception that students with dyslexia actually see letters reversed. Studies show that poor readers and inexperienced writers commonly make reversals in their writing, but there is no evidence that the alphabet letters appear visually reversed to these students. Writing reversals and naming errors seem to be artifacts of poor learning. Dyslexics simply have not developed the necessary neurobiological pathways needed to make sense of printed language when they struggle to transform the written code into the oral code.

CONTROVERSY

Discussion about dyslexia can inspire sharp debate in the reading world. Some maintain that dyslexia is an essentially meaningless term with unfortunate pathological connotations that portray the ordinary poor reader as "disabled." Some scholars grumble that ineffective sight word and whole language reading methodologies are to blame for the large numbers of students with reading problems. They claim that plummeting reading scores and soaring dyslexia statistics are the result of decades of wrong-headed teacher education practices handed down from the ivory towers. Legislators and policy wonks increasingly avoid use of the D-word. Instead, they favor phraseology such as "students at risk of reading failure" and assert that

most dyslexia is preventable and that students with reading difficulty simply need more focused, increasingly prepackaged, teacher-proof, scripted instruction.

Many experienced classroom teachers, reading specialists, and resource teachers view dyslexia as a learning disorder that properly entitles students to extra instructional time and expert professional remediation. They decry one-size-fits-all legislation and point to a tradition of individualized service in special education. They recommend fair eligibility guidelines, attention to individual assessments, and carefully targeted needs-based teaching. These clinicians point out that few classroom teachers beyond the primary grades have the resources or time to go back and provide intervention for students with dyslexia. With or without the label, students with reading difficulties will continue to need the best services of well-prepared, caring, knowledgeable reading professionals, parents, and policy makers.

—Lynn Melby Gordon

See also Learning Disabilities

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Empty Nest

Adolescence is perhaps nature's way of preparing parents to welcome the empty nest.

—Karen Savage and Patricia Adams, *The Good Stepmother*

EARLY CHILDHOOD

Early childhood is a period of development that spans the ages from 3 to 5 years, between the end of the toddler years and the start of first grade. It is the time in the young child's life when the foundation is laid for physical, linguistic, cognitive, and social-emotional abilities that will expand throughout life. Yet there is an unmistakable quality to early childhood that makes it one of the most interesting and charming periods of human development.

With the start of the early childhood years, babyhood rapidly becomes a thing of the past. The chubby, big-headed body of the baby becomes transformed into the more sure-footed, slimmer, and proportioned physique of the young child. The three- and four-word utterances used for the basic communication of wants and needs now blossoms into grammatically correct and complex sentences. There are great advances in children's thinking about real-world events, which is often expressed in creative ways through pretend play, drawing, and painting. But children's thinking is also characterized by a form of egocentrism in which inanimate objects are given human qualities, such as when young children believe that the moon and the sun follow them when they move, that dreams are movies shown on closed eyelids, and that all activity of the world ceases when the child is asleep. This type of thinking is endearing and amusing but can also cause young children to have nightmares and irrational fears of monsters in the closet and alligators under the bed and lead to the need to summon imaginary playmates as friends and protectors.

At the same time, there are great advances in children's memory capacity, general knowledge about the world, and self-control that will prepare them for the cognitive and social-emotional demands of the first grade. Continued brain development underlies many of these changes, and these new abilities result from a dynamic interplay between genetic inheritance and experiences in the physical and social world.

A table that summarizes the major developmental milestones achieved during early childhood for each of the following behavioral domains of physical growth, motor, language, cognitive, and social-emotional skills is presented toward the end of this entry.

PHYSICAL GROWTH: SIZE, PROPORTION, AND BRAIN DEVELOPMENT

From age 3 to 5, children grow in a steady manner, gaining about 5 to 7 inches in height and 8 to 10 pounds in weight, or an average of 2.5 to 3.5 inches in height and 4 to 5 pounds each year. Unlike the infancy and toddler years, when the head is bigger in proportion

to the rest of the body and "baby fat" gives all children a cherub-like appearance, in early childhood children become taller and slimmer as the proportion of torso and limbs to head starts to even out. At age 2, for most babies, the size of the head is about one fourth of their overall body, whereas the size of the head is about one fifth of the body by age 6.

There is great variation among children in physical growth, with boys growing slightly taller and heavier than girls. In addition to gender, good nutrition, physical activity, and health care are leading factors that can promote healthy growth and prevent malnutrition or obesity. The number of children who are obese today is rising, in part due to inactivity associated with more sedentary activities such as television watching and videogame playing, along with eating greater amounts of processed "junk food." Associated with higher rates of obesity is a serious increase in the number of cases of juvenile diabetes. While many children in industrialized nations acquire unhealthy patterns of nutrition and inactivity, many young children around the world today, and especially those who live in developing nations, are malnourished due to hunger, and malnourishment not only stunts physical growth, it increases susceptibility to disease and illness.

Brain development is an important aspect of physical growth during early childhood. The brain continues to increase in size and weight, although at a slower rate than previously. New synapses, or connections between neurons, continue to form, and previously established connections become stronger. Some synapses that were present at birth will be pruned away due to inactivity, as experience continues to sculpt the brain. The two hemispheres of the cerebral cortex, or the upper layer of the brain, become more lateralized, or specialized, in their functions, with the left hemisphere becoming dominant for many language functions and the right hemisphere dominant for many motor functions. Research shows that there is especially strong electrical activity in the left hemisphere of the brain from 3 to 6 years of age, while electrical activity in the right hemisphere remains at levels constant to those throughout childhood. This increased activity in the left hemisphere may be important for the many advances in language and cognition that appear in early childhood.

Throughout early childhood, the process of myelination, or the appearance of a fatty substance along the body of the neuron, persists and provides insulation to make electrical signals travel faster between neurons. This process continues well beyond early childhood, but continued myelination of the motor cortex is one factor that helps children to acquire more refined gross and fine motor skills.

THE ACQUISITION OF GROSS AND FINE MOTOR SKILLS

During early childhood, children gain increased control of their bodies. This new mastery permits them to engage in a wider range of physical activities than before. At the start of early childhood, at age 3, most young children do not have the level of control over their bodies required for highly skilled actions, but by age 5, children are able to start, stop, and change directions with sufficient skill to be able to play physical games such as tag. Researchers have discovered that activity level is higher during the early childhood years than at any other time in development, which gives young children many opportunities to practice and refine their gross and fine motor skills.

Gross motor skills involve those actions that are performed by using large muscle groups in the body. Boys tend to jump higher and throw farther than girls, most likely because they have greater muscle strength and higher activity levels. However, girls are better than boys in gross motor skills that require skilled coordination of arms and legs, such as balancing on one foot or hopping. During early childhood, the mastery of basic motor skills becomes coordinated into systems of actions that will eventually permit children to master the basic body movements required for the organized sports and games played in school and for after-school sports, such as youth soccer.

Fine motor skills involve actions that are more precise and are performed by using smaller muscle groups, typically in the fingers and hands. Girls tend to acquire fine motor skills faster than boys do and at a higher level of skill, perhaps because girls are less active than boys when it comes to gross motor skills, leaving them more opportunity to focus on the precision of fine motor skills. However, future research is needed to explore this possibility. By the end of the early childhood period, both girls and boys usually have mastered the fine motor skills required for being able to dress themselves, including buttoning, zipping, and tying shoelaces.

CHANGES IN LANGUAGE SKILLS

Children's language skills grow rapidly during the early childhood period. Throughout this process, young

children understand the meaning of more words than they can produce. Because of this interesting trend, researchers distinguish between receptive vocabulary, the words that children understand, and productive vocabulary, the words that children can use when speaking. At age 3, on average, children produce between 900 and 1,000 words and have been estimated to understand about 1,200 words. By age 6, when children enter first grade, most have a productive vocabulary of about 2,600 words and they understand over 20,000 words. Researchers estimate that during early childhood most children learn between 5 and 10 new words per day!

It is not just the number of new words that young children learn that is impressive, but also how language permits them to express more complex ideas in ways that increasingly approximate mature language ability. By the end of early childhood, children's speech reflects almost all aspects of adult grammatical forms. For example, during this time children master pronouns (e.g., "I," "me," "you"); possessives (e.g., "Mommie's," "Tommy's"); past, present, and future verb tense; and even plurals, but sometimes young children may overapply grammar rules, for example, when they say, "I have two feets!" As children gain more experience with hearing and speaking language, they learn irregular grammatical forms, so that these types of language errors typically vanish before the start of first grade.

The structure and rules of language differ the world over, yet there are remarkable similarities in language development during the early childhood years. Despite these similarities, there are differences among children in language acquisition. Many factors influence children's language acquisition, such as their genetic makeup and the extent of experience children have with language, including how much is spoken to them, whether and how parents engage them in conversations, and the degree to which literacy is encouraged through reading books together and structured activities in nursery or preschool.

Because young children learn language at such a rapid rate during early childhood, sometimes they learn words that they don't understand, much to the consternation of parents who quickly learn that swear words spoken in the presence of young children are often repeated, usually at the most inopportune and embarrassing times! Another interesting feature of language use during this age is children's use of already-mastered words to express ideas for which they haven't yet learned the right word. For example, a young child visiting the zoo and seeing an ostrich for the first time might call it a "giraffe bird," because it has the long neck feature of a giraffe, while also noting that it has feathers like most birds. In this regard, children's language skills also provide insights into their cognitive abilities.

ADVANCES IN COGNITION

Representation

Perhaps the most notable feature of early childhood is the progress in young children's ability for symbolic representation, or being able to use words, symbols, gestures, and images to stand in place of, or to ***re*-present,** people, objects, events, and actions that are not present. Representational ability permits children to move beyond the here and now, such that children can express their memories of past events and entertain the possibility of events that will happen in the future. Representational ability also permits children to think before acting, which often leads to more deliberate planning in problem solving and fewer attempts at trial and error solutions. Three- and 4-year-olds become better at planning multiple-step solutions to problems such as dragging a chair across the kitchen floor to get up onto a counter to open the cabinet door where the cookie jar lives on the middle shelf!

In addition to language acquisition and planned solutions to solve problems, the appearance of pretend play is another example of representation. With pretend play, children progress from using realistic objects, such as picking up a toy phone and pretending to talk to Daddy while he is at work, to using a variety of objects, including a block, a banana, or even a remote control, as a telephone while they fabricate imaginary conversations. Later in the early childhood period, young children engage in dramatic play by constructing scenes with assigned roles, such as "I'll be the baby, you be the Mommy, and Cookie Monster can be Daddy." Children enjoy this type of organized play, and it often functions to let them gain mastery and some degree of control over familiar situations in which they often have little control over what happens.

Limitations on Reasoning

Greater skill in thinking and reasoning comes with the growth of representational ability, but with these advances, there are also interesting limitations on

young children's logical abilities. More than 75 years ago, Jean Piaget, the famous Swiss developmental psychologist, described children's thought in early childhood as being *preoperational* in the sense that children's ability to reason was not yet fully operational in the use of logic. For example, when Piaget showed 5-year-olds two identical tall, narrow glasses of water, and then poured the water from one tall, narrow glass into a short, wide glass, children reported that there was more water in the tall, narrow glass, even though they agreed that there was the same amount of water in the two tall, narrow glasses before Piaget started pouring, and there was the same amount even when he poured the water from the short, wide glass back into the narrow, tall glass.

Piaget named this situation the conservation-of-water task and explained this surprising response as young children's failure to *conserve* the absolute quantity of water despite its transformation from one size glass to a different-sized glass. This is an example of one type of inflexibility in thinking Piaget identified in early childhood. He suggested that this inflexibility leads young children to focus only on one aspect of a problem at a time. In the conservation of water task, young children focus only on the higher water level in the tall, narrow glass without realizing that the lower water level in the shorter glass is compensated by its greater width. Young children are similarly fooled by appearances when they choose a nickel over a dime because it is bigger, or complain that a sibling was given more ice cream if the same-sized two scoops are put in a bigger dish. The trouble children sometimes have with distinguishing between reality and appearance is a unique aspect of early childhood that declines when older children are able to use logic to discover that reality and appearance sometimes differ. For example, a second-grader would tell Piaget that the amount of water is the same in the different-sized glasses and would prove it by pouring the water from the short, wide glass back into the tall, narrow glass.

Related to young children's inflexibility in thinking is the concept of egocentrism, Piaget's term for young children's tendencies to view the world only from their own unique perspective. If a young child is asked what Mommy might like for her birthday, the child is more likely to suggest a desired toy rather than something more suitable for an adult. Egocentrism also leads young children to animistic thinking—attributing human-like abilities and intentions to inanimate objects such as when they express beliefs such as the "sun goes to sleep" at night and explain that they can always see the sun or moon in the sky (when it isn't sleeping!) because it follows the child.

These observations suggest that, during early childhood, young children are limited in their understanding of the world and in their thinking skills in unique ways. While other researchers have also observed many of the same interesting early childhood behaviors that Piaget described, they have provided different explanations for why they occur, often focusing on young children's memory.

Information Processing and Memory

Instead of putting as much emphasis on egocentrism as Piaget did, other researchers explain that young children make errors on various conservation tasks, not necessarily because they are limited in their logic, but because the complexities of the task exceed the amount of information that children can remember and keep in mind long enough to think about. In a typical conservation-of-number task, where two identical rows of six buttons are lined up next to each other, and then one row is spread out in comparison to the other, 5-year-olds will typically say that there are more buttons when pointing to the row that is spread out, even though both rows contain the same number of buttons. When researchers use a smaller number of buttons in this task—three or four buttons instead of six or seven—young children are not fooled by the appearance of the spread-out row of buttons, and they demonstrate conservation of number by reporting that each row has the same number of buttons.

Many researchers today agree that Piaget underestimated the degree to which memory can affect how young children perform on cognitive tasks. This recognition has led to a focus on memory development during the early childhood years. One aspect of memory that develops during early childhood is short-term memory capacity, the amount of information children can remember and use for short periods of time. When young children hear a string of digits spoken out loud and are asked to repeat as many as they can remember, there is a steady increase from being able to remember two digits at the start of early childhood and up to four digits by age 5. In comparison, most adults remember an average of seven digits, or a range between five and nine.

Together, these advances and limitations in thinking and memory make the period of early childhood one of the most interesting. The unique quality of how children think in early childhood also provides a challenge

for those who are brave enough to try to reason with 3- to 5-year-olds! Young children's thinking skills also affect how they form social relationships with peers, gain insight into who they are in relationship to others, and gain self-control over their emotions.

THE FORMATION AND REGULATION OF SOCIAL RELATIONSHIPS AND EMOTIONS

During early childhood, the great strides that young children make across all areas of development can also be seen in their social and emotional behaviors, especially in the interesting progress that is made in how they view themselves and others as individuals, along with new skills in learning to control their emotions.

Self-Concept

The initial awareness of the self that emerges in the infant and toddler years becomes further transformed in early childhood. Young children now have the ability to form self-concepts, or to think of themselves in terms of how they look, what they like, and what they can do. For example, when children ages 3 to 5 years are asked to describe themselves, they usually say, "I have brown eyes. I like to play. I can jump as high as that tree! Marisa and Taylor are my best friends." Young children's self-descriptions are usually overly positive and not always grounded in reality, and it is not until they are school-aged that they can move beyond describing themselves in generally positive emotional terms (e.g., "I'm really happy.") to understanding that it is possible to experience both positive and negative emotions at the same time (e.g., "I was happy to play kickball at recess, but mad because I kept making outs").

Another important aspect of the awareness of the self can be seen in how children come to understand the concept of gender and how it guides their understanding of gender stereotyped behaviors, including who and what they choose to play with.

Gender

At the beginning of the early childhood period, children already can correctly identify themselves as a boy or girl and can also correctly identify the sex of their parents. Once they can do this, they are ready to understand that gender is permanent or that girls become mommies and boys become daddies. Similarly, young children become experts at figuring out gender-stereotyped behaviors, or the socially acceptable behaviors for boys and girls. Often parents are dismayed by how rigid their child's ideas are about gender-appropriate behaviors, including the belief that boys and girls only play with certain toys, wear clothes of certain colors, and have certain jobs or social roles. However, it takes longer—often not until as late as the second grade—for children to understand that gender remains constant despite outward, physical changes. The strength of gender-stereotyped ideas can lead young children to become confused about a person's gender when, for example, they see a Scottish boy wearing a kilt; they question whether he is still a boy or whether a girl with a very close cropped haircut is really a girl. Simple superficial transformations in appearance, similar to the transformation of water from one size glass to another in the conservation task, can lead young children to be confused about reality. Thus, while young children understand the permanence of gender over time, they do not yet fully understand that gender remains constant despite superficial changes in appearance until sometime after they enter school.

Gender not only guides young children's behaviors, but it also exerts a powerful influence on whom children choose as playmates. As early as age 3, young children not only engage in play around gender-stereotyped activities (e.g., boys engage in group games and rough and tumble play, while girls play more quietly in smaller groups at dress-up or pretend play or with art materials), but they tend to play only with same-sex peers. Researchers found that when given their choice of free play, over 80% of the children observed preferred to play with same-sex peers. The tendency to play with same-sex peers is so strong in early and middle childhood that similar trends have been observed in the United States, Europe, Africa, India, Mexico, the Philippines, and in rural as well as in urban areas.

Although playing with same-sex peers is the clear preference, young children are capable of playing with opposite-sex peers and playmates, especially in situations where there is little choice, such as playing with siblings, or when child care providers or preschool teachers structure mixed-sex group play activities. Despite a clear preference for playmates, the ability to take turns in games, cooperate with others, and develop real friendships with peers blossoms in early childhood. A contributing factor to young children's ability to get along with peers and develop friendships stems from a

Table 1 Table of Milestones of Early Childhood

Behavioral Domains	*3 Years*	*4 Years*	*5 to 6 Years*
Physical growth	*Height* 37 *in.* *Weight* 32 *lb*	*Height* 40 *in.* *Weight* 36 *lb*	*Height* 43 *in.* *Weight* 40 *lb*
Proportion head to body	• One fourth		• One fifth
Gross motor skills	• Ascends staircase with alternating steps	• Descends long staircase with alternating steps if aided	• Descends long staircase with alternating steps unaided
	• Hops with irregularity	• Hops and stands on one foot for 5 seconds	• Hops well and stands on one foot for 10 seconds
Fine motor skills	• Draws "+" and "0" • Can screw and unscrew jar lids	• Copies "X" • Uses scissors to cut paper	• Copies letters • Uses fork and spoon to eat
Language skills			
Productive vocabulary	• 900–1,200 words		• More than 2,600 words
Receptive vocabulary	• 12,000 words		• 20,000 words
Sentence length	• 4 to 5 words	• Up to 8 words	• Complex sentences
Cognitive skills			
Representation	• Pretend play, using appropriate toy objects		• Pretend play, using any object
General knowledge	• Sorts objects by size and shape	• Knows some numbers and colors	• Can count to at least 10 and can name four or more colors
Short-term memory capacity	• About two items		• About three to four items
Social and emotional skills			
Gender	• Correctly labels own sex		• Rigid stereotypes of boy and girl behavior
Social interaction	• Imitates playmates and can take turns	• Cooperates with other children	• Wants to be with and please friends
Regulation of emotion	• Emotional outbursts		• Use of strategies to control emotions

growing competence in recognizing and controlling their emotions.

Emotions and Emotion Regulation

During the early childhood years, parents are often surprised when their young child wakes up crying from a nightmare or expresses fear over monsters in the closet or alligators under the bed. Recent research, based on interviews with 4- and 6-year-olds, found that almost 75% of children reported being fearful of ghosts and monsters and being afraid of the dark, bad dreams, wild animals, and getting lost. Many of the fears that young children have may not seem real to adults, but because of their growing representational skills and difficulty in being able to distinguish reality from fantasy, young children are capable of imagining very frightening situations. Such fears can usually be managed with understanding from a sympathetic adult or the intervention of a night light or favorite

stuffed animal or blanket, until children learn strategies to control their own emotions.

The ability to understand and control emotions undergoes significant changes during early childhood. The tantrums of the "terrible twos" decrease in number and intensity, although 3- to 5-year-olds may still have an occasional emotional outburst or tantrum. Instead of the tantrums of the 2-year-old, 3- to 5-year-old children begin to learn strategies for dealing with and controlling their feelings. For example, young children may close their eyes, turn away, or put their hands in front of their faces when they know something scary might be approaching, such as a barking dog or a movie scene. As their language abilities grow, young children also learn to use speech and words to deal with their emotions, from expressing their anger at a parent by shouting, "You're very mean, Daddy, and I hate you!" to speaking to themselves out loud as encouragement while undertaking a challenging task. Child care providers and parents alike frequently remind young children to "use your words" instead of hitting a playmate in anger over a contested toy.

SUMMARY

Early childhood is a truly remarkable period of human development. During this time, parents recognize that their child is no longer a baby and is blossoming into an independent thinking, feeling, speaking, and active young child. Along with significant advances in all areas of behavior, early childhood is unique for the emergence of a foundation for the mature behaviors that will continue to evolve throughout development, ranging from skilled actions, language, and reasoning to social relationships. At the same time, early childhood presents an interesting set of unique qualities, such as wild flights of imagination and creativity, irrational fears, and a type of logic that makes reasoning with a 4-year-old nearly impossible, but amusing when not frustrating.

—Janette B. Benson

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EARLY INTERVENTION PROGRAMS

Early intervention can be both broadly and specifically defined. Generally speaking, the term refers to any specialized assistance provided to very young children, but can be used to define services needed by many, such as immunizations and child care, or it can be specifically targeted to a special population. It might even include programs that are not generally considered to be aimed at children but have a major influence on their lives, such as Medicaid and Food Stamps.

In the most common usage of the term, early intervention is most often recognized to be health, education, and social services and specific or targeted interventions for very young children and their families, with an emphasis on disadvantaged or developmentally delayed children.

Early intervention as we know it today is derived from over 300 years of political, social, and academic influence. Many of the fundamental theories in early childhood development are the foundation for the concepts of today's interventions. Laws have enabled most people in the United States to receive the benefit of these services. Legislation was passed in 1975 to enact the Education for All Handicapped Children Act, known as Public Law (P.L.) 94–142. This law requires all states that accept federal aid for special education to offer all disabled students a free and appropriate education. The year 1990 brought major changes to the original Education for All Handicapped Children Act with the Individuals with Disabilities Education Act (IDEA) or P.L. 105–17.

IDEA specifically provides funding to those early intervention programs targeted to overcome the cognitive, emotional, and resource limitations that may characterize disadvantaged or developmentally delayed children during the first several years of life. This funding allows a broad population to receive treatment regardless of income level or social status.

TYPES OF EARLY INTERVENTION

Specialized early intervention services are provided to children who are discovered to have, or to be at risk of developing, a disability, or who exhibit a weakness or delay in a particular area. These services begin at any time between birth and 3 years of age and focus on resolving, minimizing, or eliminating existing developmental problems or delays.

Children eligible for early intervention services must be experiencing developmental delays in one or more of the following areas: cognitive development; physical development, including vision and hearing; language and speech development; psychosocial development; and self-help skills. Children may also be eligible due to diagnosed physical or mental conditions (such as cerebral palsy or Down syndrome) or certain family circumstances that put them at risk of having substantial delays.

Early interventions include, but are not limited to: developmental evaluations and assessments, physical therapy, occupational therapy, speech/language therapy, audiology, nutrition services, special education, and psychological and social work services.

Services range from identification—that is, hospital or school screening and referral services—to diagnostic and targeted or direct intervention programs. These direct interventions may include occupational therapy to help an infant learn to hold her bottle, physical therapy to help her learn to roll over, or speech therapy to help her learn to eat. The following are examples of specific intervention therapies.

Speech and Language Therapy—Speech and language pathologists provide early intervention services for children with, or at risk for, speech, language, and swallowing disorders.

Occupational Therapy—Occupational therapists work with sensory integration disorders, arousal levels, tactile defensiveness, fine motor weaknesses, and oral motor needs. Occupational therapy may be provided in early intervention, early childhood, and school programs, in work settings, and through private agencies, such as Easter Seals.

Physical Therapy—Physical therapists work with at-risk children on developmental motor levels (gross and fine), oral motor, neuromusculoskeletal systems, and functional motor skills. The therapist will aid the family in areas of mobility, positioning, play skills, and handling techniques.

Nutrition Services—Nutritionists can provide services to children at risk for certain developmental delays that may be caused by or otherwise impact the child's health through nutrition. The nutritionist analyzes and recommends treatments for anthropometric, biochemical, and clinical variables, feeding skills and feeding problems, and food habits and food preferences.

Audiology—Audiologists identify children with auditory impairment, using at-risk criteria and appropriate audiologic screening techniques. They determine the range, nature, and degree of hearing loss and communication functions and provide needed referral for medical and other services for children with auditory impairment. Audiologists also provide auditory training, aural rehabilitation, speech reading and listening device orientation and training, and other services such as selecting, fitting, and dispensing listening and vibrotactile devices.

Assessment-Based Behavior Support—Assessment-based or psychological test–based approaches address challenging behaviors associated with developmental delays. Focus is on the development of communication, social interaction, and language skills. Many families rely heavily on this type of support to help them cope with the behavioral difficulties associated with children with special needs. When positive behavior is forthcoming, parents are more likely to spend time teaching and providing intensive care to their child. Families thus are eager to collaborate with professionals in understanding how to guide a child's social and communication development.

No matter which service is provided, the best early interventions are designed to provide a secure, stimulating environment for children to learn and to overcome the challenges that they face.

ENHANCING CHILD DEVELOPMENT

There are three primary reasons for intervening early with any child who exhibits disability, weakness, or delays. These reasons are (1) to enhance the child's development, (2) to provide support and assistance to the family, (3) and to maximize the child's benefit to society. When properly administered, early

intervention can correct existing developmental problems or prevent potential delays.

Research in child development has established that the rate of learning and development is most rapid in the first 3 years of life. With diagnosis of a delay, disability, or high-risk factors at birth or soon after and the imposition of intervention, developmental gains are greater, and the likelihood of developing further problems is reduced. If this stage of optimal readiness is not taken advantage of, a child may have difficulty learning a particular skill at a later time. Thus, timing of the intervention becomes particularly important.

Researchers have noted that along with early identification of a deficit, the assignment of the appropriate program can best help children develop their full potential. To be most effective, early intervention programs should include these important features: the age of the child at the time of intervention, the amount of parent involvement, and the intensity and structure of the program.

Successful programs are highly structured and clearly specify actions and objectives. These programs closely monitor child and family behaviors and frequently examine the provider's interaction, session plans, and regular activities. In addition to structure, the intensity of the services, particularly for severely disordered children, appears to affect outcomes. Individualizing instruction and services to meet each child's needs also is reported to increase effectiveness.

In any early intervention, the effective outcome can only come from a partnership between the service provider, the child, her family, and the case manager and community resources.

THE IMPORTANCE OF FAMILY SUPPORT

The family is a critically important and sustaining influence on a young child's development and is considered a major participant in the early intervention process. Intervention efforts are focused on providing the support, resources, and services the family needs to support their child. The main goal of a family-centered approach is to enhance the developmental and behavioral progress of the child and to strengthen and empower the entire family unit.

Both the child and family work together with a service provider to help the child achieve predetermined goals. Service providers such as physicians, diagnosticians, speech and language pathologists, nurses, teachers, early childhood educators, occupational/physical therapists, and special educators are those usually associated with helping the child and family.

Early intervention services have a significant impact on the parents and siblings of a developmentally delayed infant or young child. The family of the at-risk or delayed child often feels disappointment, social isolation, frustration, and helplessness. This stress may affect the family's well-being and interfere with the child's development. Families of these children are found to experience increased instances of divorce and suicide, and the challenged child is more likely to be abused than are his nondelayed peers. Early intervention can result in parents having improved attitudes about themselves and their child, improved information and skills for teaching their child, and more downtime for leisure and enjoyment of other family members. Parents of gifted preschoolers also need early services so that they may better provide the supportive and nourishing environment needed by the child.

Parents of disadvantaged, developmentally delayed, and gifted children need a variety of support and skills to cope with their child's special needs. A parent's involvement in their child's treatment is especially important, as it affects both the well-being of the child and the entire family. When family members are fully engaged in the intervention, they can expect outcomes to include the ability to implement the child's program at home and a reduction in the stress that impacts the health of the entire family.

LASTING BENEFITS TO SOCIETY

The long-term goal of early intervention services is the development of a healthy member of society. Intervening as early as possible in a child's life seems to predict a more successful outcome and long-lasting effect. Many years of research on intervention between the ages of birth and 3 years have resulted in evidence of developmental and educational gains for the child. Early intervention increases the odds of improvement for functioning of the family and results in long-term benefits for society. Early intervention has been shown to result in the child needing fewer special education and other habilitative services later in life, being retained in grade less often, and in some cases being indistinguishable from nondelayed peers years after intervention.

Both developmentally delayed and socioeconomically disadvantaged children benefit from early intervention. Results of studies on disadvantaged children showed that children involved in early intervention

programs significantly maintained the gains they made as young children through early adulthood. These children were more committed to schooling, and more of them finished high school and went on to post-secondary programs and employment than children who did not attend the intervention programs. They scored higher on reading, arithmetic, and language achievement and showed fewer antisocial or delinquent behaviors outside of school.

While there is still much research to be done, current measures show that carefully targeted early childhood interventions can yield measurable benefits in the short run and that some benefits persist long after the program has ended. Most of the earliest research involved structured service to disadvantaged children. The children were at risk for delays due to socioeconomic factors rather than specific organic developmental delays. This research was the precursor to the services we know today and is an important part of the overview of early intervention services. Below is a sample of a few of the major research projects conducted over the last 50 years.

EARLY INTERVENTION RESEARCH PROGRAMS

Well-designed, well-funded early intervention programs can have large and significant effects. Designing successful intervention programs includes general guidelines. It is considered optimum to begin intervention before age 3, but intervening at the preschool and school-age level can also be effective. Disadvantaged and developmentally delayed children seem to benefit most from early intervention, and therefore provide ideal target populations. The most important aspect of intervention is the nature of the interaction between provider and child. Several university-based model programs have followed these guidelines and, as a result, have shown desirable long-term outcomes. These include the Carolina Abecedarian Project, the Early Training Project, the Early Intervention Collaborative Study, and the High/Scope Perry Preschool Project. Large, publicly funded programs such as Project Head Start have also exhibited positive results.

THE CAROLINA ABECEDARIAN PROJECT

The Carolina Abecedarian project was started in 1972 at the Frank Porter Graham Child Development Center of the University of North Carolina. The goal of the intervention was to remedy mild mental retardation and improve both academic and social competence for disadvantaged children. Specifically, the study was designed to examine the relative effects of early education, day care, and other methods of early intervention on intellectual functioning and early academic achievement.

The Carolina Abecedarian Project involved full-day intervention from birth to age 5 and then followed up with an intervention for school-aged children. The Abecedarian Project revealed that, at age 15, those children who had received a preschool intervention scored higher on achievement tests and had lower incidence of special education and grade retention. At age 21, the children who received the preschool intervention were twice as likely to still be in school or to have attended a 4-year college.

THE EARLY TRAINING PROJECT

One of the very first large studies was the Early Training Project directed by Susan Gray in Murfreesboro, Tennessee, in 1962. The motivation for this program was concern over the progressive retardation of low-income children in school. The intervention was designed to improve academic performance through better cognitive performance and achievement orientation.

The Early Training Project showed dramatic reductions in use of special education among youth at age 12, although there were no statistically significant differences between treatments and controls in achievement test scores, grade retention, or high school graduation.

EARLY INTERVENTION COLLABORATIVE STUDY

The Early Intervention Collaborative Study (EICS) is a longitudinal investigation of approximately 190 children with developmental disabilities (Down syndrome, motor impairment, developmental delay) and their families. Participants entered the study during the infant or toddler years at the time of enrollment in an early intervention program. This important national study followed the children in 29 programs. All but 11 children made significant gains. Although those with severe impairments made slower progress, early intervention helped them maintain their skills and prevent regression.

THE HIGH/SCOPE PERRY PRESCHOOL PROJECT

The Perry Preschool Project involved a half-day of preschool every weekday plus weekly 90-minute home

visits over a fairly long time span. Teacher-to-student ratios were 1:6, and all teachers had master's degrees and training in child development. The Perry Preschool Project resulted in positive effects on achievement tests, grades, high school graduation rates, and earnings, as well as lowering crime and welfare use.

The study of long-term outcomes in Perry Preschool has been closely aligned with Head Start in an attempt to promote the benefits of early intervention and to draw attention to the effects of investments in program quality

PROJECT HEAD START

The most well-known of all early intervention programs, and certainly one of the largest, is Head Start. Initially designed and implemented as Project Head Start in 1965, its chief architects included child development experts Julius Richmond and Edward Zigler. The project was the result of a combination of factors, including public and policymakers' concern about the growing number of children living in poverty in the United States.

The main concern was over subpar educational standards among the inner-city poor. From its inception, Head Start and Early Head Start focused on services specifically geared toward the development of healthy and skillful relationship building between very young children and their parents and caregivers.

A few studies have attempted to follow the children participating in Head Start past elementary grades, and there is evidence that, in the short term at least, Head Start is contributing to school readiness by improving verbal skills and health.

Given the paramount importance of health for very young children, a major focus of the Early Head Start program was to ensure that women received the health services needed to promote a healthy pregnancy and birth and that very young children received early and ongoing well-baby care, immunizations, and other essential health services to support their development. This continues today.

The Head Start program has served more than 15 million children at a cost of $31 billion since 1965 and, as of this writing, is serving approximately 900,000 children a year.

CURRENT RESEARCH MODELS

Guided by the results of the programs developed in the 1960s and the ongoing evaluations of even earlier interventions, researchers have continued to design and evaluate new and more targeted intervention programs. Recent efforts include selecting strict criteria to better identify families and children at risk. For example, scientists are using new research tools such as brain scans to test new interventions. Researchers have recognized that intensive intervention prior to age 2 can result in significant gains for the targeted group of children with autism and related disorders.

The focus on intervention at the earliest ages continues, with many programs in place that start not only with the birth of the child, but with prenatal care designed to provide the child with the best possible life outcome.

COST TO SOCIETY

What is the long-term cost effectiveness of early intervention? Even though the highly specialized nature of the comprehensive services needed to produce significant developmental gains can be costly, results are generally positive. Researchers have made an effort to quantify the costs of intervention programs and have found examples of significant long-term cost savings.

The total costs of educating a child are actually less if intervention services begin at birth. It has been calculated that the total cost of special services if begun at birth is $37,273 and the total cost if begun at age 6 is between $46,816 and $53,340. The cost is less when intervention is earlier because of the remediation and prevention of developmental problems that would have required special services later in life.

Children with preschool education had fewer years in grades and a higher projected lifetime earning than children without interventions. When schools invest about $3,000 for 1 year of preschool education for a child, they immediately begin to recover their investment through savings in special education services. Studies have shown improved performance and less need for later intervention, and for every dollar spent on early treatment, $4.00 to $7.00 in savings are realized.

CONCLUSION

For nearly 50 years, researchers, universities, and governments have made significant efforts to close the gap between children with disabilities and those who experience normal development. Children with disadvantageous circumstances are at risk for a host of problems starting as early as birth and persisting through adulthood. Particularly damaging conditions to these

children include, but are not limited to, developmental disabilities and delays, socioeconomic disadvantage, and poverty. Additionally, gifted and special needs children without the associated risk of poverty also benefit from some type of intervention. Early intervention has been based on the premise that children of poverty and, more recently, children with any type of developmental differential can achieve significant improvements in cognitive, academic, and social outcomes. A great deal of progress has been made in our ability to provide effective early intervention for young children with problem behaviors and compromised abilities.

Early childhood—the prenatal period through the beginning of school—is a unique developmental period that serves as a foundation for behavior, well-being, and success later in life. Some children are subjected to stressors during early childhood that impede normal development. These stressors may include insufficient cognitive stimulation, nutritional deprivation, inadequate health care, and maladaptive social interaction. Early intervention to correct these impediments has the potential to promote healthy development in at-risk children.

Program development over the past 25 years has been based on the knowledge that providing highly effective services results in prevention of serious problem behaviors. The challenge now is to continue to create new methods of delivering the highest quality and successful intervention means possible. As new knowledge is acquired, services can be implemented in a consistent and thorough manner and result in effective early intervention.

Family participation and constructive support teams are necessary for meaningful and durable outcomes for both the child and the family. Service providers can identify children at risk and supply services and education to improve diverse developmental issues. Placing emphasis on the important elements of early intervention—diagnosis, planning, program selection, and development—in the first few crucial years results in better experiences throughout a child's life.

—Susan J. Moore Glenn

See also Abecedarian Research Project, Head Start, Perry Preschool Program

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EATING DISORDERS

Eating disorders are characterized by extreme attitudes and behaviors surrounding weight and food issues. Included in this class of disorders are anorexia nervosa and bulimia nervosa. Although each of these disorders is manifested in distinct ways, they both have the potential to result in extreme harm to physical and psychological health and can have life-threatening consequences. Clinical and scientific interest in eating disorders has increased greatly in the past 20 years. As a result of this growing interest, advances have been made in how these disorders are conceptualized. The abundance of studies in this area has led to an increased understanding of the warning signs, possible causes, and treatments related to eating disorders.

DEFINITION AND IDENTIFICATION

Anorexia Nervosa

Anorexia nervosa is an eating disorder that is characterized by self-starvation and excessive weight loss. In order for a health care professional to diagnose an individual with anorexia nervosa, certain criteria must be met. These criteria are outlined in the *DSM-IV-TR*, or the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*, published by the American Psychiatric Association. One of these criteria is a person's refusal to maintain body weight at or above a minimally normal weight for an individual's age and height. Specifically, an individual must weigh less than 85% of expected body weight. In children, there may be a failure to make expected weight gain during periods of growth, which would lead to a body weight that is less than 85% of that expected. Additional criteria necessary to diagnose anorexia nervosa include intense fear of gaining weight or becoming fat, even though the individual is underweight; disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight; and amenorrhea, the absence of at least three consecutive menstrual cycles in females.

Body image refers to the way people see themselves when looking in the mirror or when picturing themselves in their minds. Individuals with anorexia nervosa have a distorted body image. That is, they perceive parts of their bodies unlike they really are, which leads them to feel uncomfortable and awkward in their bodies and to feel ashamed, self-conscious, and anxious about their bodies. Individuals with anorexia tend to overestimate their body size. Some individuals may perceive that their entire body is overweight, while others will recognize that they are thin but perceive specific parts of their bodies to be fat. The word anorexia actually means loss

of appetite. This definition is misleading, however, because individuals with anorexia nervosa rarely experience loss of appetite. Rather, they intentionally try to lose weight through restricted dieting, purging, or excessive exercise. Anorexia nervosa can be classified in one of two ways, based on the manner in which an individual attempts to limit caloric intake. In anorexia nervosa restricting type, individuals try to lose weight by strict dieting, fasting, or exercise. In anorexia nervosa binge-eating/purging type, individuals engage in regular binge eating (consuming large quantities of food in a relatively brief period of time, accompanied by a perceived lack of control) or purging, or both.

Intervening during the early stages of anorexia nervosa can significantly improve the likelihood of recovery. Therefore, it is important to be aware of some of the warning signs of this disorder. Common warning signs include dramatic weight loss over short periods of time; preoccupation with weight, food, calories, fat grams, and dieting; dieting despite extreme thinness; comments about feeling fat or overweight despite weight loss; development of food rituals or eating very small quantities of food; repeated excuses to avoid mealtimes or situations involving food; excessive, rigid exercise regimens; anxiety about gaining weight or being fat; denial of hunger; withdrawal from usual friends and/or activities or other depressive symptoms; and any behaviors and attitudes indicating that weight loss and dieting have become primary concerns. It is important to note that, by themselves, each of these signs is not definitively diagnostic of anorexia.

Bulimia Nervosa

Bulimia nervosa is characterized by a secretive style of binge eating followed by behaviors such as self-induced vomiting to compensate for the effects of binge eating. In order to diagnose bulimia nervosa, certain symptoms or criteria must be present, as set forth in the DSM-IV-TR. These criteria include recurrent episodes of binge eating; recurrent, inappropriate compensatory behaviors in order to prevent weight gain, such as self-induced vomiting or use of laxatives, diuretics, excessive exercise, or strict dieting; binge eating and compensatory behaviors occurring on average of at least twice a week for 3 months; and self-evaluation that is overly influenced by body shape and weight.

Individuals with bulimia nervosa may overestimate their body size to the same extent as individuals with anorexia nervosa. While persons with bulimia or anorexia share some characteristics, such as overestimation of body size, there are also major differences between the two groups. Both diagnostic categories show significant concern about their weight and make attempts at controlling it. Most persons with bulimia, however, maintain weight within the average range for their age and height, while those with anorexia experience dramatic weight loss. Fluctuations in weight may occur in bulimia as a result of alternating cycles of bingeing and fasting or dieting, but dramatic weight loss will generally not occur in these individuals.

Bulimia nervosa can also be classified in one of two ways: purging type and nonpurging type. Individuals who have bulimia nervosa purging type engage in regular self-induced vomiting or regular misuse of laxatives or diuretics. Those who are diagnosed as having bulimia nervosa nonpurging type use other forms of compensation for their overeating, such as fasting or excessive exercise. It has been estimated that as many as two thirds of individuals with bulimia engage in purging, with self-induced vomiting being the most frequently reported method of purging among individuals who seek treatment for this disorder.

Similar to anorexia nervosa, the chance for recovery from bulimia nervosa increases the earlier the disorder is detected. Thus, awareness of the following warning signs can be instrumental in successful recovery: evidence of binge eating, such as disappearance of large amounts of food over short periods of time or the presence of empty wrappers or containers indicating the consumption of large food quantities; evidence of purging behaviors, such as frequent trips to the bathroom after meals, empty packages for laxatives or diuretics, or vomit-like odors; excessive, rigid exercise regimens; swelling of cheeks or jaw area; calluses on hands or knuckles from self-induced vomiting; staining or discoloration of teeth; withdrawal from usual friends and/or activities; and any behaviors or attitudes indicating that weight loss and dieting are primary concerns. As with the warning signs of anorexia, each of these signs by themselves is not absolutely diagnostic of bulimia nervosa.

PREVALENCE

Most estimates indicate that the risk for developing anorexia nervosa is highest during adolescence and early adulthood. Occasionally, however, this disorder is seen in prepubescent children as young as 7 or 8 years old. Anorexia nervosa primarily occurs in

females, with only 10% of reported cases being male. Estimates regarding the frequency of cases in the population vary. According to the *DSM-IV-TR*, prevalence estimates, or estimates of the actual number of cases in the population at a certain point in time, suggest rates of 0.5% for anorexia nervosa among females.

The number of cases of anorexia nervosa has increased in the past two decades. This increase is likely due to greater awareness of this disorder among the public and among health care professionals. The secretiveness and shame associated with eating disorders, however, is likely to prevent many cases from being reported. Therefore, rates obtained from self-reports in doctor's offices may be underestimates of the true number of cases in the population.

Similar to anorexia nervosa, bulimia nervosa primarily occurs in young females and typically develops in late adolescence or early adulthood. The prevalence of bulimia nervosa, as stated in the *DSM-IV-TR*, is approximately 1.0% to 3.0% among females, while the occurrence of this disorder in males is approximately one tenth that of females. As with anorexia nervosa, bulimia nervosa may be increasing in the population.

HEALTH CONSEQUENCES

Individuals who have anorexia nervosa subject their bodies to a cycle of self-starvation, which denies the body the essential nutrients it needs to work properly. This causes the body's normal functions to slow down, resulting in serious medical consequences. Among these consequences are abnormally slow heart rate and low blood pressure; increased risk for heart failure; reduction of bone density or osteoporosis; muscle loss and weakness; severe dehydration, which can result in kidney failure; fainting, fatigue, and overall weakness; dry hair and skin; and hair loss.

The recurrent binge-and-purge cycles that are characteristic of bulimia can also have serious health consequences. These cycles can affect the entire digestive system and can lead to electrolyte and chemical imbalances in the body, which influence heart and other main bodily functions. Specifically, these imbalances can lead to irregular heartbeats and possibly heart death. Additional health consequences that may result from bulimia nervosa include inflammation and rupture of the esophagus from recurrent vomiting, tooth decay and staining from stomach acids released during vomiting, and irregular bowel movements as a result of laxative use.

UNDERLYING CAUSES

Several theories have been proposed in an effort to explain why eating disorders originate, but no single factor has been labeled as the major cause of any type of eating disorder. Most modern theorists believe that biological, social, cultural, and psychological characteristics interact to contribute to the development and maintenance of eating disorders.

Biological

Research suggests that a person's genetic makeup might increase the likelihood that he or she will develop an eating disorder, although this biological role is thought to be minimal. Eating disorders have been found to run in families. Relatives of patients with anorexia or bulimia nervosa, particularly female relatives, are more likely to develop an eating disorder themselves. Additional evidence for a genetic contribution to the development of eating disorders comes from twin studies indicating that the likelihood of identical twins having an eating disorder may be greater than 50%.

Familial

Family structure and family functioning have also been identified as possible contributors to the development of eating disorders. Some theorists have argued that anorexia nervosa and bulimia nervosa develop when mother-child relationships are impaired. Negative interaction patterns among family members may also play a role in the development of these disorders. Families of eating-disordered children are likely to lack the ability to manage conflicts appropriately. Children are more likely to develop eating disorders if they are raised in families in which family members are overprotective of one another, overinvolved in one another's affairs, or resistant to family change. It has also been suggested that children develop eating disorders as a means of diverting attention away from family problems, such as marital discord, and toward themselves.

Family processes can lead to an overemphasis on weight and dietary control. Mothers who are critical of their daughters' body weight or who engage in frequent dieting themselves, for example, may unintentionally foster the development of an eating disorder. Parents who are frequently absent, uninvolved, or have unusually high expectations are also thought by family processing theorists to contribute to eating

disorders in their children. Families of adolescents with eating disorders are more likely to be characterized by negative communication patterns and mistrust and to engage in fewer helping behaviors.

The connection between early childhood sexual abuse and eating disorders remains unclear. Some studies of the general population indicate that women with bulimia nervosa are more likely to have been sexually abused as children than women without the disorder. Other studies, however, have not found similar results among individuals with eating disorders. In addition to sexual abuse, other forms of stress or trauma, including physical abuse, being bullied, parental divorce, or concerns over being homosexual have been implicated in the development of eating disorders.

Social and Cultural

Historically, it was thought that eating disorders occurred only in White, middle-class women. Recently, however, studies have shown that eating disorders exist in minority populations as well. Research has indicated that, in the United States, eating disorders seem to occur as frequently in Hispanic females as in Caucasian females and to be most common among Native Americans. The occurrence of these disorders is less frequent among Black and Asian females.

Anorexia nervosa and bulimia nervosa tend to occur more frequently in industrialized societies. According to the *DSM-IV-TR*, these disorders may be most common in the United States, Canada, Europe, Australia, Japan, New Zealand, and South Africa. It is widely believed that certain features of contemporary Western culture heavily influence eating disorders. In American society, a thin body type is preferred and is considered ideal. This ideal is abundantly portrayed through magazine ads, television shows, and other forms of media. Young girls and women compare themselves to an idealized body image that hardly resembles what most women in our population look like. Alarming numbers of women report being dissatisfied with their bodies and feeling guilty about eating normal quantities of food. At an early age, American girls adopt the cultural focus on dieting and thinness, which is likely to play a role in the onset of eating disorders.

While eating disorders can occur in individuals from any socioeconomic group, females from higher socioeconomic status groups tend to be more concerned with becoming thin than females from lower socioeconomic status groups. White females from middle- and upper-class societies tend to base evaluations of self-worth and success on outward physical appearance. Thus, eating disorders among individuals in this group serve to restore a sense of satisfaction with physical appearance and self-control.

The fact that eating disorders are far more common in females than in males has been attributed to societal assumptions about what it is to be feminine and what it means to be masculine. Specifically, the focus here is on the belief that girls receive positive attention and reinforcement for being attractive, while boys receive attention and praise for their achievements. Young women tend to base their self-perceptions and identity on the status of their relationships, and these relationships are often heavily influenced by body image and physical appearance.

Subgroups in which there are increased pressures to diet or maintain a thin shape may be particularly susceptible to eating disorders. For example, research suggests that there is a high occurrence of eating disorders among athletes and performing artists. Particular subgroups in which high incidences of eating disorders have been reported are ballet dancers, professional dancers, wrestlers, swimmers, and gymnasts.

Psychological

The biological, social, and cultural forces mentioned above are thought to contribute to and interact with psychological processes in the development and maintenance of eating disorders. The risk of developing an eating disorder is increased when outside pressures to be thin and attractive interact with internal psychological factors, particularly during times of developmental growth and change. For example, as a result of family or societal influences, a young girl may begin to think she is fat and unattractive as her body develops into a more adult form. In order to avoid the unwanted growth that accompanies the transition into adulthood, this young girl may develop an eating disorder.

Individuals with anorexia nervosa may be described as obsessive, emotionally restricted, approval-seeking, and resistant to change. These characteristics can lead to vulnerability during developmental transitions that involve rapid and notable change, such as puberty. Many persons who seek treatment for anorexia also meet the criteria for one or more personality disorders. Depression and anxiety are common among individuals with eating disorders and are usually manifested near the onset of the disorder. The personality of an adolescent with bulimia is likely to be characterized by

frequent mood swings and lack of impulse control. Abuse of alcohol or stimulants occurs in at least one third of adolescents who seek treatment for bulimia.

Perfectionism may account for the high frequency of depression among individuals with eating disorders. A high need for perfectionism in combination with a high level of daily stress is likely to lead to depression. The likelihood of developing an eating disorder is greater among individuals who have a high need for perfectionism and also think of themselves as being fat or unattractive. In other words, individuals with eating disorders perceive their actual self to be different from their ideal self, so they develop symptoms of an eating disorder in an effort to reach their perceived ideal self.

Adolescents with bulimia or anorexia may believe that limiting food intake and losing weight are means by which to gain control over their lives and to become better people. They may start out with a moderate diet, which will gradually develop into the rigid eating patterns characteristic of anorexia or bulimia. Teenagers may unintentionally initiate a dangerous eating cycle because they are dissatisfied with the way their bodies look, following which their efforts are rewarded by weight loss and a sense of greater self-control. Extra attention from peers may serve to reward dieting behavior and lead to a transition from dieting to a full-blown eating disorder.

TREATMENT METHODS

Treatment methods for anorexia and bulimia have changed significantly over the past 20 years. Early treatment focused on the need for patients to use insight into emotional traumas to uncover fears surrounding food consumption. The recognition that treatment must involve more than just insight led to the evolution of more sophisticated and comprehensive approaches. Modern treatment approaches, particularly psychological interventions, are leading to more effective outcomes for adolescents and adults with eating disorders. In addition to changes in specific treatment approaches, changes have occurred regarding who treats individuals with eating disorders. The discovery of anorexia nervosa and bulimia nervosa in pediatric populations has led to increased involvement of pediatric psychologists in the treatment of these disorders.

Anorexia Nervosa

Although anorexia is typically less responsive to treatment than bulimia, progress has been made in the treatment of this disorder. The treatment of anorexia typically consists of two stages: weight restoration and psychotherapy. The goal of the first stage is for anorexics to restore body weight while under the supervision of a medical professional. This stage may require inpatient hospitalization, either in a general medical unit or a psychiatric unit. During the weight restoration stage, individuals with anorexia are gradually reintroduced to increasing quantities of food until they are able to reach a daily intake of approximately 2500 calories.

Many patients will successfully gain weight while in the hospital, but may return to maladaptive patterns of weight loss and distorted beliefs about food and body image once they are released from the hospital. For this reason, it is important that the second phase of treatment, psychotherapy, be implemented. Through psychotherapy, patients achieve an understanding of their experience with anorexia nervosa, the factors that led to the development of the disorder, how the disorder was maintained, and how to prevent relapse.

Psychotherapy for anorexia nervosa may include behavioral, cognitive-behavioral, and family components. Behavioral techniques can be implemented both during and after the weight restoration stage. Specifically, interventions involve rewarding individuals for positive behaviors. During the weight restoration phase, for example, patients may be rewarded for weight gain by being allowed to participate in hospital activities and privileges. Similarly, patients may be rewarded for weight maintenance once they have left the hospital. These types of behavioral approaches have been shown to lead to short-term success.

The use of cognitive-behavioral therapy to treat anorexia nervosa evolved out of the belief that anorexics have distorted ways of thinking, distorted beliefs, and distorted perceptions. For example, as mentioned earlier, individuals with anorexia nervosa have the faulty belief that they are evaluated based on their weight or body shape. Another example of distorted thinking in anorexia is the tendency to overestimate body size and to believe that eating will lead to loss of control and obesity. Cognitive-behavioral therapies lead to changes in eating behaviors by rewarding or modeling appropriate behaviors and helping patients change distorted or rigid thinking patterns. Although cognitive-behavioral therapy is a popular choice among professionals who treat individuals with anorexia nervosa, few research studies have proven that it is more effective than other therapies in treating this disorder.

For individuals who are younger and still living at home, family therapy is a treatment of choice for anorexia. Family therapy is important because parents are responsible for their children's well-being and can help bring about change by providing assistance in reaching treatment goals while being present in the child's physical environment. Additionally, family therapy serves to restore healthy communication among family members, while eliminating the unhealthy communication patterns that led to the eating disorder in the first place. By involving the entire family, therapists can look at family members' attitudes toward body shape and body image, which may have been interpreted by the child with anorexia as critical judgments.

Group therapy is generally not an effective method of treatment for individuals with anorexia nervosa. These individuals typically have difficulty with social interactions and, due to their preoccupation with weight and negative views of their body, do not welcome group interaction of this sort. Regardless of the type of treatment applied, patients with anorexia have a tendency to deny their illness or to minimize the severity of their symptoms. This denial can stand in the way of progress, regardless of which treatment modality is chosen.

Bulimia Nervosa

Most patients with bulimia nervosa can be treated as outpatients, as they do not typically require the same degree of medical supervision that is required by individuals with anorexia nervosa. Some estimates indicate that approximately 10% of individuals with bulimia nervosa will require inpatient treatment. Inpatient treatment is usually considered when patients have severe medical complications as a result of their eating disorder, are suicidal, or have failed to improve after outpatient treatment. Persons with bulimia also differ from persons with anorexia in that they often seek treatment on their own and are able to acknowledge that they have a problem. Persons with anorexia, on the other hand, tend to be brought in for treatment by their family members and typically deny the severity of their problem.

As with anorexia nervosa, cognitive-behavioral therapy has been used to treat bulimia nervosa by addressing distorted thoughts about eating, weight, and body shape. In treating bulimia, the goals of cognitive-behavioral therapy are to establish more normal eating patterns, change distorted thoughts underlying the disorder, discuss physical and psychological problems related to the disorder, and prevent the disorder from emerging again in the future. Patients learn to identify circumstances that trigger binge eating and avoid such circumstances. Research has shown significant support for the effectiveness of cognitive-behavioral approaches in treating bulimia.

A type of cognitive-behavioral therapy, exposure plus response prevention, is used to prevent self-induced vomiting in patients with bulimia nervosa. This method involves having a patient eat what they would normally eat during a binge episode. The patient is then guided by a therapist in learning how to resist vomiting and how to deal with anxiety that might result from not being able to purge. A related approach involves having a patient consume small amounts of food, which would typically lead to loss of control and a binge episode. In this situation, the therapist teaches the patient how to avoid or prevent a subsequent binge. After time, the patient will no longer experience anxiety after eating and will no longer feel the need to purge to relieve that anxiety.

Research supports the effectiveness of cognitive-behavioral and behavioral approaches in treating patients with bulimia nervosa. These approaches have resulted in significant reductions in both binge eating and self-induced vomiting. Additionally, these effects appear to remain stable over time, with some studies reporting the absence of binge/purge behaviors for 7 to 10 years following the termination of treatment.

Drug Treatment

Due to the strong association between eating disorders and emotional states like depression and anxiety, attempts have been made to treat these disorders with various medications. Antidepressants and antianxiety medications are among the drugs that have been used with eating-disordered patients. Antianxiety medications have been used to help patients cope with the anxiety they encounter as a result of having to eat during the refeeding phase. Antidepressants have been used to help patients with bulimia decrease the number of bingeing and purging behaviors in which they engage. Another class of medications, called opiate blockers, is believed to prevent persons with anorexia from feeling euphoric during periods of starvation. The prevention of this euphoric feeling is expected to make starvation less of a rewarding experience for the patient with anorexia and, therefore, may lead the patient to start eating again.

Generally speaking, a number of medications for bulimia nervosa and anorexia nervosa have produced positive short-term effects. The long-term effectiveness

of these medications, however, is unclear. High relapse rates occur once these medications are discontinued. Furthermore, numerous changes in medication are often required over time, and patients tend to discontinue taking medications before they are advised to do so, often to avoid their negative side effects. Thus, while drug treatment does have a place in the treatment of eating disorders, psychotherapy appears to be the preferred method of treatment.

SUMMARY

Eating disorders are primarily disorders of young females, with those in adolescence or early adulthood being at greatest risk for developing these disorders. Bulimia nervosa and anorexia nervosa, though distinct in certain ways, can both result in serious harm to physical and emotional well-being. Increased attention to these disorders over the past 20 years has led to an increased awareness and understanding of their underlying causes. Most modern theorists believe that biological, familial, social, and cultural factors interact with one another, leading to the devilment of anorexia nervosa or bulimia nervosa in an individual.

Treatments for these disorders have shifted from a focus on insight to more comprehensive approaches, involving behavioral, cognitive-behavioral, and family therapies, as well as drug treatment in some cases. As mentioned previously, the chance of recovery from anorexia nervosa or bulimia nervosa increases when these disorders are detected early and treated promptly. Thus, it is important to be aware of the warning signs associated with these disorders.

Fortunately, social and cultural patterns may be shifting toward healthier norms of eating. This may be due to increasing public advertisements, talk shows, and television shows devoted to discussions of eating disorders and healthier decision making. Nonetheless, many people continue to suffer from the physical and emotional effects of eating disorders, and these disorders can result in mortality if professional help is not sought out.

—Danielle Rosnov and Michael C. Roberts

See also Anorexia Nervosa, Binge Eating, Bulimia Nervosa, Dieting, Nutrition, Obesity

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ECHOLALIA

Echolalia derives from the Greek words "echo" meaning "sound," and "lalia" meaning "a form of speech." In Greek mythology, Echo is a nymph, an unfortunate victim of Zeus' jealous wife, Hera, who is punished by Hera and no longer able to use her voice except in the form of echolalia. Echolalia refers to speech in stock phrases that simply involves copying and repeating another person's utterance word for word. For example, a child might immediately repeat out loud his mother's utterance "Drink your milk" at the dinner table, or a child might say "Trix are for kids" over and over again, repeating something he or she had obviously heard on TV the day before.

Five stages of expressive speech have been identified in early linguistic development: isolated sounds, syllabic utterances, awareness of one's sounds, echolalia, and flexible production of meaningful words in context. Echolalia is considered by some to be a

normal developmental occurrence in typical language acquisition. During the echolalic stage, infants characteristically repeat their caregiver's words, which may serve the function of rehearsal and practice for words and language. In typically developing children, echolalia peaks between 2 and 3 years of age, and then decreases. In this context, the term echolalia refers to a typical developmental phenomenon that occurs for a brief period of time during the course of some children's linguistic maturation.

Although echolalia may refer sometimes to a developmental stage in normal speech acquisition, the term is more commonly used to refer to a peculiar and common characteristic displayed by a variety of special needs children experiencing atypical development. In this context, echolalia refers to the apparently noncommunicative and meaningless repetition of another person's vocalizations, commonly found in children diagnosed with various disorders, such as autism, mental retardation, schizophrenia, Gilles de la Tourette syndrome, aphasia, and dementia. Among some children with autistic spectrum disorders who are verbal, echolalia is the only form of speech available to them. For other high-functioning autistic children, echolalic utterances appear sporadically together with more meaningful generative speech.

In these special populations, echolalia is typically displayed with more rigidity, less melodic intonation, and more persistence than that of normal children. Echolalia can be either immediate (i.e., repetition of someone else's words just spoken) or delayed (i.e., repetition of words or sentences after considerable time has elapsed). Also, the utterances repeated can also come from TV or from other media, rather than originating from face-to-face human interaction.

There is debate over the functions of echolalia for children with autistic spectrum disorders and other special needs. Some researchers believe that echolalia has no meaning for many autistic children and that it does not represent an attempt to communicate. Others think echolalia is a way for a child without many language skills to express their lack of comprehension. For some autistic children, echolalic speech is all they have and it does appear to be used at least at times to initiate and maintain social interaction or to regulate one's own actions. For example, a mother may ask the child to say hello: "Say hello, Jim," at which point the child repeats, "Say hello, Jim" and this is the best greeting Jim can produce. The difficult task for family members with a predominantly echolalic child, of course, is to figure out what the child's echoed utterances might mean. One typically needs to consider both the present situation and many prior contexts of the message being echoed.

In both typical and atypical populations, as language improves, echolalia diminishes by itself. Therefore, the majority of interventions for persistent echolalia in special populations have focused primarily on improving the quality of the child's general expressive speech, rather than discouraging echolalia specifically.

—Lesley Ducenne and Adam Winsler

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ECOLOGICAL THEORY

There have been many different approaches to explaining development, but one especially has tried to deal with the importance of the environment without ignoring the uniqueness of the individual. Urie Bronfenbrenner, and more recently along with Pamela Morris, has developed what is called an experimental ecology of human development or an ecological theory of human development. Within this model he stresses the importance of the developing person in his or her surrounding environment. He defines the phrase ecology of human development as the study of "the progressive, mutual accommodation, throughout the life span, between a growing human organism and the changing immediate environments in which it lives."

His basic argument is that traditional studies in human development are very rigorous and tightly controlled. While this can be a benefit, the studies are also very limited in scope because many of these experiments take place in settings that are unfamiliar to the

participants and artificial in their construction. In other words, they don't very accurately represent what the real world is about; in Bronfenbrenner's earlier and own words, developmental research has been "the study of the strange behavior of children in strange situations for the briefest possible period of time."

Because he is so concerned with the qualities and characteristics of the environment, part of his ecological model defines a series of structures that are "nested" within one another. In his earliest works, he described four such structures. These structures nest or "fit" within each other, beginning with the microsystem (as he points out much like the stacking Russian dolls that disappear within one another).

The *microsystem* reflects the immediate setting that contains the person. Keeping in mind how our immediate setting changes throughout the day, the microsystem in which we find ourselves changes as well. Although the library might be the microsystem in which we found ourselves late at night, our office or classroom might be the parallel microsystem during the day.

All microsystems have three different dimensions. The first is the *physical space and activities* within the microsystem such as the lighting over our desk or the temperature of the classroom during a test. The second is the *people and their roles* who are part of the microsystem such as our roommate or our classroom teacher. Finally, the third is the *interaction between the people* in the microsystem and the person. At one time, for example, we might be angry with a roommate who does not do his or her assigned tasks. At another time, we might act like best friends.

The second level, called the *mesosystem*, focuses on the relationships between the different settings that the person is in during different times in development. The mesosystem focuses on interrelations among microsystems. For example, the mesosystem for college freshmen might consist of the dining hall, the classroom, home, and the intramural softball field.

The third element is the *exosystem*. Bronfenbrenner believes that the exosystem is a set of specific social structures that do not directly contain the individual, but still have an impact on the person's development. These structures "influence, delimit, or even determine what goes on" in the microsystem of the developing individual. The individual does not participate in these settings, but they do have a direct impact on his or her behavior. For example, an exosystem might be the doctor's office, the teacher's lounge, or grandma's house. These are all places with an indirect impact on the person's development.

The last element or structure in his model is called the *macrosystem*. It consists of all the elements contained in the micro-, meso-, and exosystems, plus the general underlying philosophy or cultural orientation within which the person lives. As Bronfenbrenner says, these are the "overarching institutional patterns of the culture or subculture, such as the economic, social, educational, legal, and political systems of which local micro, meso, and exosystems are the concrete manifestations" (p. 8).

This early model of the ecology of human development helps us in two primary ways as far as understanding human development. First, it places the interaction between nature and nurture in a very clear and easily definable context of one of the four systems discussed above. Second, it encourages us to move away from laboratory-based settings and begins to examine development in the "natural stream" of when and where it occurs. More and more scientists who study human development are emphasizing the qualitative nature of changes and using such methods that reflect that emphasis—away from the more tightly controlled laboratory study.

But, as with all good scientists, Bronfenbrenner has moved on. Along with Morris's help, he has taken the next step and further developed their ideas placing an emphasis on several new and complimentary ideas. The primary change in the ideas presented almost 20 years ago, and now referred to as part of a bioecological model, involves proximal processes (or interactions in the immediate environment).

1. In order for the person to develop, he or she needs to be an active contributor to the environment.
2. These activities and contributions have to take place on a regular basis and over an extended period of time.
3. These activities also need to become more complex over time—doing the same thing as before will not act as the "engine" of development that Bronfenbrenner and Morris emphasize.
4. The process of development is a reciprocal one where each member of a dyad or group influences each other member.
5. While interactions with people are very important, interactions with objects are important as well.
6. The importance and role of proximal processes change over time as the individual and environment change as well.

Bronfenbrenner's original model has clearly expanded to further emphasize the importance of the environment and the interaction between the individual and his or her environment. It is a rich display of ideas and the importance of the role of our social world and its influence upon us.

—Neil J. Salkind

See also Bronfenbrenner, Urie; Nature-Nurture; Theories of Development

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EGO

The term "ego" is today in common usage. People use the term "ego" in a variety of ways. Because the word is in everyday usage, people assume they know what it means. However, a word such as ego varies in the ways in which it can be used. As Wittgenstein sought to explain, we can think we know the meaning of a word, but it can have a variety of meanings depending on its use. Wittgenstein believed that meanings of words arise out of the social and interactive nature of language. The original meaning of the word is derived from the Latin *ego*, meaning "I" or "self." While the term ego retains the basic "I" or "self" meaning, it has also come to apply to our sense of identity, our individuality, and our executive and organizer functions as well as the center of our consciousness. We have carried the word ego into the English language and normalized it. We do not say "the I" when we refer to ourselves, but very often we say "the ego" as if to refer to a specific thing or part of our minds.

Today we find that ego, as used in the vernacular, means that some people have an inflated feeling of pride that elevates them above others (superiority). This meaning is usually associated with self-importance, egotism, and pride. We also see the term ego being used in reference to our consciousness of our own identity. Carl Jung's notion of *anima* in reference to the inner self being in touch with the unconscious is an example of this type of usage. Also associated with this usage is the notion of an alert cognitive state in which you are aware of yourself and your situation. Another use of the term ego comes from the psychoanalytical method of Sigmund Freud. In Freudian terms, the ego is the reality principle. It is the seat of reason and is responsible for our thoughts and feelings mediated by our understanding of social norms and expectations.

The study of the ego or ego psychology began at the turn of the 20th century as philosophy and psychology became two separate disciplines. By the 1930s, the field of ego psychology had earned a respected place in psychological studies. However, a battle between Anna Freud's view and Heinz Hartmann's view of the ego was at the forefront of ego psychology during this period. Anna Freud focused on the defensive nature of the ego while Hartmann focused on its adaptive potential. According to Robert Kegan, these two views were not reconcilable. On the one hand, Anna Freud's view of the ego was a defense mechanism that sought to ward off anxiety that could lead to the ego's breakdown. On the other hand, Hartmann's view of the ego was one that encompassed the process of meaning making. The idea of the ego as a meaning-making agent can be found in the work of Robert Kegan, Carl Rogers, Jean Piaget, and Jane Loevinger, while the idea of the ego as a defense mechanism that mediates the id (or our impulsive desires) can be seen in the work of psychoanalysts such as Sigmund Freud, Anna Freud, Karen Horney, and Eric Erickson.

The basic difference in the Freudian conception of the ego and that of meaning-making psychologists is that in the former the ego arises or develops from an interaction with our social and cultural experiences, while in the latter it is considered to be with us at birth as a process and as such is an active agent in our ability to make sense of our world experiences. Adler, a student of Freudian psychology, departed from Freud's view of the ego. While Freud thought that the ego was derived from drives through processes of frustration and renunciation, Adler understood the ego to provide a reference for the way in which one structures one's world and perceives his or her experiences in the world.

The debate as to the origin and function of the ego is still very much alive today. We have on the one side, those who see the ego as residing in the real world. The ego is driven by the id and attempts to accomplish what the id wants. The ego develops out of our need

to interact with the world and the id's need for a mediator. It is on the foundation of Sigmund Freud's structural ego that Anna Freud's Ego Psychology, Melaine Klein's object relations, Erikson's notion of identity development, and Heinz Kohut's self-psychology were built. On the other hand, other theorists, especially developmental psychologists, view the ego as an innate process that organizes our life experiences. As such, the ego helps us derive meaning from our life experiences and develop our world view.

There are also many philosophers who have contributed to our understanding of the ego and how it develops. George Herbert Mead (1934) developed his understanding of the "I" and "me" in his seminal work, *Mind, Self, and Society: From the Standpoint of a Social Behaviorist.* James Mark Baldwin (1897) in his work entitled *Social and Ethical Interpretations in Mental Development*, discusses the development of the individual (or self) in relation to the evolution of society. In *The Nature of the Self*, Risieri Frondizi (1953) argued that the self is an organic unity and its parts cannot be understood in isolation from each other. This opposed those who treated the self as an aggregate of parts rather than a whole.

The word "ego" has a vast array of meanings and usages. The Oxford Reference Online Library lists 68 definitions for the word "ego" and its associated usages. How one understands the word "ego" depends on which theoretical or philosophical assumptions one makes. Ego is closely tied to concepts of self, identity, consciousness, and way of being. However, the common element in all the meanings is the central understanding that the ego is intimately connected to the "I."

—Helen M. Gore-Laird

See also Adler, Alfred; Ego Development; Freud, Sigmund; Id; Psychoanalytic Theory; Superego

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EGOCENTRISM

Our everyday conception of egocentrism involves people behaving "selfishly" or failing to be "considerate" of others. While egocentrism does in fact typically manifest itself in failures to take other people's perspectives, it is more rooted in human cognitive shortcomings than in any motivation to be selfish. In both children and adults, egocentrism arises when we fail to recognize the idiosyncratic nature of our own knowledge or the subjective nature of our own perceptions. Such failures describe the child at play who covers his eyes and joyfully exclaims to his parents, "You can't see me!" Likewise, they describe the adult physician who provides her patient with a medical diagnosis that only another doctor could understand.

The Swiss psychologist and biologist, Jean Piaget (1896–1980), pioneered the scientific study of egocentrism. He traced the development of cognition in children as they move out of a state of extreme egocentrism and come to recognize that other people (and other minds) have separate perspectives. Within the framework of Piaget's stage-based theory of cognitive development, the infant in the *sensorimotor* stage is extremely egocentric. During these first 2 years of development, infants are unaware that alternative perceptual, affective, and conceptual perspectives exist. Once they reach the *preoperational* stage (2–7 years), children come to recognize the existence of alternative perspectives but usually fail to adopt these viewpoints when necessary. Using a variety of ingenious tasks, Piaget discovered that children in this stage often do not recognize that another person who is also looking at the same nonuniform object as them, but from a different angle, sees it differently. Piaget's observation that older children stopped displaying such instantiations of egocentrism led him to argue that children overcome egocentrism when they reach the *concrete-operational* stage and come to appreciate that different perspectives afford different perceptions. Piaget's theory of cognitive development posits that by age 7, most of us are

free of egocentrism. Since Piaget, research within developmental psychology on children's *theory of mind* has continued to explore egocentrism in many areas of social and cognitive reasoning, such as perception, communication, and moral judgment. This research has generally maintained its focus on young children's instantiations of egocentrism and the developmental stages at which these are overcome. Another important tradition in psychology that has also advanced our understanding of egocentrism—though largely in isolation from the theory-of-mind tradition in developmental psychology—is the heuristics and biases tradition in cognitive and social psychology. Research on heuristics and biases that affect human judgment has demonstrated that, even well into adulthood, our perceptions are characterized by various egocentric shortcomings. These include the *false consensus effect*, whereby people tend to overestimate the extent to which their own preferences are shared by others; the *curse of knowledge*, whereby experts in a particular domain fail to adequately take into account the level of knowledge of laypeople with whom they are communicating; the *illusion of transparency*, whereby people tend to exaggerate the degree to which their internal emotional states (such as anxiety during public speaking) are evident to outside observers; and the *spotlight effect,* whereby people tend to overestimate the degree to which aspects of their appearance and actions are noticed by others.

Although egocentric biases are generally more subtle in adulthood than in infancy, the persistence of some forms of egocentrism in adulthood suggests that overcoming egocentrism may be a lifelong process that never fully reaches fruition. Opening channels of communication between developmental psychologists, who study theory-of-mind, and social and cognitive psychologists, who study judgmental biases, is likely to generate a host of new and interesting questions while allowing both fields to make important theoretical advances.

—Emily Pronin and Christopher Y. Olivola

See also Cognitive Development

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EGO DEVELOPMENT

Ego development refers to the evolution of a personality construct that synthesizes experience into a coherent sense of how individuals view themselves. In this way, the ego development is at the center of the investigation of human experience. In another, it is an attempt to fathom the organization of one's own mind; a process one scholar suggested was analogous to "shoveling smoke."

Psychoanalytic thinkers were first to pursue a notion of the developing ego. Highlighting a multifunctional tripartite mind, Freud simultaneously proposed the ego as both helpless mediator of aggressive and libidinal impulses and director of personality functioning. From these seemingly contradictory perspectives, two schools of thought emerged—object-relations theory in Britain (Fairbairn, Klein, Winnicott) and ego psychology in the United States (Erikson, Hartmann, Horney). Both failed to propose a comprehensive theory of ego development and instead relied on the general idea that ego develops via interactions between id and societal realities.

In the work of Piaget and Kohlberg, ego development is dealt with in a far more cognitive and subtle fashion than with psychoanalytic thinkers. Piaget's focus on the development of intelligence—specifically symbolic reasoning—as the ultimate achievement of the species suggests itself as a primary ego demonstration. That is, for Piaget, how one sees the world is a function of intellectual development. Kohlberg proposes similar claims regarding moral reasoning and the expression of ego. Though these descriptions did not bare the hallmark of psychoanalytic interest of the ego as the unifying characteristic of personality, their construction of the

ego as a cognitive entity, in part, offered an alternative framework from which development can occur.

Loevinger (1976), a self-described psychoanalytic iconoclast, was first to offer an explicit structural model of ego development. Merging psychoanalytic interest of ego with a notion of development built on adaptation, she proposed that ego development was a singular, cognitively seated activity demonstrated through impulse control, character, interpersonal relations, conscious preoccupations, and cognitive complexity, among other traits. For Loevinger, ego development occurs through an evolution of stages, each named for functions or characteristics most prevalent for an ego level. First is the Presocial Stage followed by the Symbiotic Stage, Impulsive Stage, Self-Protective Stage, Conformist Stage, Self-Aware Level: Transition from Conformist to Conscientious Stage, Individualistic Level: Transition from Conscientious to the Autonomous Stage, Conformist Stage, and Integrated Stage. That is not to say that ego development occurs in a singular direction from the Presocial Stage to the Integrated Stage. Instead, ego development is an individualized process—though most people are recognized at the Conformist, Self-Aware, or Conscientious Stages. Though Loevinger rejected age norms for stages, earliest stages are largely unseen in adult populations, whereas higher numbered stages are unattainable by children. Most notable of this research agenda is the degree to which stages are supported by empirical data. Using the Sentence Completion Test (SCT), they established a theory as empirically grounded as any other in personality literature.

Challenges to Loevinger include calls that her model, built on interviews and psychometric analysis, is too limited as an approach to the study of something as encompassing as personality and arguments that the stages lack philosophical grounding. Broader criticism is aimed at the use of stages over trait perspectives in the study of personality in general, including ego development. It has been of interest for nearly a century, and its attendants should take comfort in the fact that any psychology claiming to capture human experience cannot exist without a rendering of its current roles and current notions of ego fulfillment, however smoky that may be.

—Sean A. Forbes

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ELDER ABUSE

Elder abuse is a term that has both specific and general meanings. Specifically, the term refers to volitional acts (acts of commission) of physical, sexual, or psychological violence perpetrated against individuals over age 65 by family members or other individuals in positions of trust, such as health care providers. The term is not usually used to denote acts of violence perpetrated against elders by strangers. The term is also used, generally, as a cover term to denote, by commission or omission, an array of harmful acts perpetrated against elders by intimate others including neglect, exploitation, and abandonment.

In recent years, researchers have advocated the use of the term "elder mistreatment" as the cover term, reserving the term "elder abuse" to refer to only volitional acts of violence. Some absence of clarity in the literature arises from this lack of distinction. Other definitional issues arise in the literature related to whether the term applies equally to vulnerable elders and nonvulnerable elders, whether cases include situations of self-neglect, and whether the identity of the perpetrator makes a difference in the definition. Because a substantial proportion of elder abuse is perpetrated by intimate partners, some researchers view abuse by spouses under the rubric of late-life intimate partner violence and consider it separately from abuse perpetrated by other family members. In general, how these definitions are applied is defined by individual state statutes.

Estimating the frequency of elder abuse is complicated because of definitional problems and the fact that there has never been a nationwide, population-based prevalence study. However, the National Center on Elder Abuse notes a steady increase in the number of cases reported since 1986. In 2003, reports from Adult Protective Service (APS) agencies estimated 166,019 substantiated cases of elder mistreatment in the United States. There is agreement that the number of substantiated cases reflects a small percentage of

the actual cases, and the discrepancy lies in failure to recognize and report mistreatment by those in contact with elders and the reluctance of many elders to self-identify.

The National Center on Elder Abuse indicates that signs requiring further investigation include bruises, broken bones, burns, abrasions, pressure marks, pressure sores, poor hygiene, and unusual weight loss. Also requiring investigation are sudden withdrawal from usual activities, a change in alertness, sudden changes in financial situations, frequent arguments or tense relationships between elders and their family caregivers, and evidence of belittling or threats. While no one characteristic of elders puts them at high risk for mistreatment, researchers agree that certain characteristics of caregivers should be considered red flags, including alcohol and drug problems; personal problems exacerbated by the caregiving situation; coexisting physical and mental problems; being overburdened by the demands of caregiving mainly due to unrealistic expectations, lack of knowledge or preparation, and dependence issues; the family's social isolation; and previously existing interpersonal conflict.

Treatment for elder abuse is complicated because the autonomy of the elders and their preference for treatment must always be considered. In addition, in some states, treatment options are limited by the availability of resources and affordable, alternative living arrangements. Often the most feasible approach to treatment is the prevention of the next episode through counseling and education. In addition, APS agencies can often place outside workers in the home to act as monitors. In emergency situations, where the elder's life is threatened or the elder is too mentally disabled to make an autonomous decision about a treatment preference, elders can be removed from abusive situations. Whether or not the elder is removed from the situation, in most states perpetrators can be prosecuted.

—Linda R. Phillips

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ELDER MALTREATMENT

Many types of family violence have been recognized, including child abuse, wife abuse, and, more recently, elder abuse. All forms of family violence are at epidemic levels in the United States, yet considerably less investment has been made in reducing elder abuse than child and wife abuse.

WHAT IS ELDER ABUSE?

Elder abuse, like other forms of maltreatment in families, can take several different forms. The National Elder Abuse Incidence Study (NEAIS) of 1996 defined domestic elder abuse—that is, elder abuse perpetrated by members of the family or household—as including the following forms of maltreatment: (1) *physical abuse*—any form of physical aggression that could result in bodily injury, physical pain, or impairment; unwarranted administration of drugs and physical restraints; force-feeding; and physical punishment; (2) *sexual abuse*—any form of nonconsensual sexual contact; (3) *emotional or psychological abuse*—the inflicting of anguish, emotional pain, or distress; (4) *neglect*—the refusal or failure to provide such life necessities as food, water, clothing, shelter, personal hygiene, medicine, comfort, and personal safety; (5) *abandonment*; (6) *financial or material exploitation*—the illegal or improper use of the elderly person's funds, property, or assets; and (7) *self-neglect*—behaviors by older people that can be injurious to their own health or safety. Although this definition has the advantage of being broad and inclusive, it raises a number of issues that have generated debate—particularly with regard to what constitutes neglect, whether "self-neglect" is a form of maltreatment, and whether using an elderly parent's economic resources for personal gain is abusive. If older adults wish to maintain their autonomy and avoid dependence on adult children, is it correct to say that the adult children neglected them if poor health leads to bedsores and other serious health problems? If older people neglect their personal

care and hygiene, are they being maltreated? Or should terms such as "maltreatment" be reserved for acts committed (or omitted) by someone other than the individuals themselves? Finally, is financial exploitation of elderly parents abusive if those parents feel an obligation to help their grown children?

HOW COMMON IS ELDER MALTREATMENT?

Estimates of the extent to which elder maltreatment occurs in the United States vary considerably. One important source of information is the NEAIS of 1996, which collected two types of information: (1) official reports on domestic elder abuse from Adult Protective Service (APS) agencies, and (2) reports on personal experience with elder abuse cases from individuals in "sentinel agencies." APS agencies are the agencies in each state that have the responsibility for investigating reports of elder abuse. Sentinel agencies, such as financial institutions, law enforcement agencies, hospitals, and elder care providers, are agencies that are mandated by law to report suspected cases of elder abuse. Because many more cases of domestic elder abuse occur than come to the attention of professionals, reports from both APS and sentinel personnel are likely to significantly underestimate the actual frequency with which elder abuse occurs in the United States.

Based on information from sentinel agency personnel, approximately 450,000 of the 44 million U.S. residents older than age 60 were abused and/or neglected in a domestic setting in 1966. This number is equivalent to a rate of 11.3 cases of maltreatment per 1,000 elders. Only 16% of these incidents were reported to APS for investigation. This underreporting reflects to a considerable extent the disbelief of mandated reporters that reporting will actually help the victims of maltreatment. When self-neglect, the most commonly reported type of abuse, is added to the definition of elder abuse, more than 551,000 elders were abused in 1996; 21% of these were reported to APS for investigation. Other estimates of the incidence of elder abuse are much higher. For example, the U.S. House Select Committee on Aging suggested in 1991 that somewhere between 1 million and 2 million elders are abused each year in the United States. Given that not all cases are reported, this is likely to be a better estimate of the actual extent of elder maltreatment.

Of the types of elder abuse that are reported and substantiated by APS agencies, the largest percentage is typically for neglect, followed by emotional/psychological abuse, financial exploitation, physical abuse, abandonment, and sexual abuse. Within domestic settings, older men and women may be abused by a variety of family members, including grown children, grandchildren, spouses, and others. Abuse by spouses is more likely to go unreported than reported. Spouses are the perpetrators in only 19% of cases reported to APS, as compared to more than 30% of unreported cases. The rate of abuse by elderly spouses may be as much as 41 per 1,000 elders. As is true of spousal abuse at younger ages, husbands are more likely to hurt their wives than wives are to hurt their husbands. Injuries have been shown to occur in approximately 6% of physically abused elderly husbands and 57% of physically abused elderly wives.

In contrast to spousal elder abuse, the abuse of elders by adult relatives who are entrusted with their care is the most researched and most widely recognized type of elder abuse. According to both reported APS cases and the larger number of identified sentinel cases in the NEAIS, elderly females were more likely to be abused than elderly males. This was the case for every type of use reported to APS except for abandonment, in which males were more likely to be victimized. Finally, several researchers point out that much elder abuse is committed by adult children who are dependent on the elders. These researchers find that in comparison to nonvictimized elders, elders who are abused are more likely to have their adult children dependent upon them in several areas, including housing, household repair, financial assistance, transportation, and cooking and cleaning.

LEGAL ISSUES

By 1991, all states had elder abuse statutes in their laws and/or had amended their existing laws to bring elders under APS protection. Currently, every state has an intervention agency, usually APS, that handles cases of elder abuse. However, there is little to no uniformity in the laws for, definitions of, or provisions for elder abuse across states. For instance, 46 states have mandatory reporting laws, such that professionals who care for elders must report

suspected cases of abuse. Failure to do so can usually make the reporter guilty of some kind of misdemeanor. The other four states (Colorado, New York, Wisconsin, and Illinois) have voluntary reporting. Of those states with mandatory reporting, 15 require mandatory reporting not only from professionals, but also from *anyone* who suspects elder abuse. Furthermore, in many cases of elder abuse, domestic violence laws (for cases of spousal elder abuse) or guardianship laws (for cases in which a frail elder needs to be removed from an abusive home) are applicable. Despite the existence of mandatory reporting laws, many professionals do not report all the cases in which they suspect elder maltreatment. Physicians appear to be particularly unlikely to report all of the cases of elder mistreatment that they see.

PREVENTION

More attention has been given to intervention in cases of elder maltreatment (although even in this area resources are inadequate) than has been given to prevention of the problem. When cases of elder abuse are reported to APS, agency workers are responsible for assessing the referred client's level of risk, taking immediate action to protect the client's safety and property, collecting evidence to substantiate abuse, assessing the need for services, providing crisis intervention, arranging for needed services, and serving as client advocates—all forms of intervention that follow an incident of potential maltreatment.

The few available prevention programs generally focus on preventing financial exploitation by family members or others. One of the better known programs is the Fiduciary Abuse Specialist Team (FAST), which originated in Los Angeles. FAST is a multiagency task force established to stop elder financial abuse before it is accomplished. Typical members of FAST include police, public guardians, APS personnel, and probate court representatives. Although other efforts to prevent elder abuse are limited, there has been some effort to develop family-life curricula to help prevent elder abuse in stressed multigenerational families. One curriculum has components on teaching older individuals and their relatives how to cope with common sources of stress and conflict, how to communicate effectively with each other, and how to use family and community resources. There are also recommendations for engaging and empowering elders in an integrative response to elder abuse—for example, through involving them directly in developing programs, detecting abuse, processing cases, assisting victims, and evaluating programs. Finally, concerned advocates from the American Psychological Association have argued that, to deal effectively with elder maltreatment, it is essential to educate the public more fully about the problem, increase the availability of respite care, increase the supports available for families caring for elders, and encourage counseling and treatment for problems that contribute to elder abuse.

—Denise A. Hines and Kathleen Malley-Morrison

See also Elder Neglect

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ELDER NEGLECT

Current estimates suggest that 1 million to 2 million American's older than age 65 have been abused, neglected, or exploited by someone with whom they have placed their trust. Although standards may vary across cultures regarding the level of respect, attention, and support provided to the elderly, all cultures recognize the increased vulnerability that occurs with aging. Elder neglect occurs when the increased needs of the elderly are unmet by a designated caretaker. The specific legal definition of "elder neglect" varies from state to state (Table 1). However, all generally define it as the failure of an individual to provide the basic necessities needed for mental and physical health. This includes a failure to provide adequate food, water, clean clothing, medical care, or a safe living environment. Neglect can occur by family members with

legal responsibilities to the elder, or by agencies providing caretaker services to the elder (e.g., in-home nursing, residential retirement centers).

ELDER NEGLECT

The American Medical Association (1996) defined neglect as the failure to provide goods and services necessary for functioning or to avoid harm. These goods and services include personal care, medications and appropriate medical attention, adequate nutrition, and a safe environment. Neglect has been further defined according to the intent of the abuser. Passive elder neglect often occurs from an omission or failure to act and is often considered unintentional, due to a lack of information or resources. In contrast, active neglect is considered to be an intentional, malicious withholding of adequate goods and services. While the medical definition may distinguish between passive and active neglect, it is important to note that, in most jurisdictions, the legal consequences are the same for neglect by act or omission.

Elder neglect occurs between a vulnerable elder and an individual or organization in a caregiving relationship. The relationship can be through kinship, such as an adult child caretaker, or contractual, such as an employed caretaker. State law determines the age at which neglect of an adult is considered "elder neglect," usually at age 60 to 65. Conceptually, elder neglect cannot occur if the elder has the capacity for self-care and self-protection. In some states, the legal definition of capacity is the benchmark. Another important distinction is that of self-neglect; the failure of the elder to meet their own basic needs or protect themselves. Self-neglect often occurs in the presence of some form of dementia. The differentiation between self-neglect and neglect concerns whether or not a caretaking relationship has been established. While several federally funded agencies research and provide services to victims of elder abuse and neglect, the legal definition of elder neglect varies and is provided by state law.

Table 1 Sample of State Law Elder Neglect Definitions by Statute

State	*Statutory Definition*
California	§ 15610.30 "**Neglect**" includes negligent failure of any person having the care or custody of elder of a dependent adult to exercise that degree of care that a reasonable person in a like position would exercise.
Georgia	§ 30-5-3 "**Neglect**" means the absence or omission of essential services to the degree that it harms or threatens with harm the physical or emotional health of a disabled adult or elder person.
Texas	§ 48.002 "**Neglect**" means the failure to provide for one's self the goods or services, including medical services, which are necessary to avoid physical or emotional harm or pain or the failure of a caretaker to provide such goods or services.

RISK FACTORS

A common misconception is that adult children are more often the perpetrators of elder abuse. In fact, spouses are more likely to commit elder abuse than adult children. This phenomenon has been referred to as "domestic violence grown old," given that the abuse often begins earlier in life, as domestic abuse, and continues into old age. Several abuser characteristics have also been identified. Studies have found that caretakers with mental illnesses, in particular depression, are more likely to commit elder abuse. Elder abusers also tend to score higher on measures of hostility and also tend to be financially dependent on the victim of elder abuse. While alcohol abuse is very common among elder abusers in general, those who commit elder neglect have not been found to have an increased rate of alcohol abuse.

There are several well-established risk factors for elder abuse in general. Elders with cognitive impairments, such as dementia, have an increased risk for abuse. Shared living arrangements are also an established risk factor, with elders living alone having the lowest risk for abuse. While living alone tends to decrease the risk for elder abuse, strong social networks and ties to the community also decrease the risk of elder abuse.

Adult Protective Services (APS) reports that the majority of elder abuse victims are women. However, given that there are more female elders in the population, it is difficult to determine if gender is a true risk factor. Several studies have actually found more male elders abused than females.

CONSEQUENCES

There has been little research investigating the consequences of elder neglect. Often, research reports will assess the consequences of elder mistreatment as a whole, rather than differentiating between the effects of abuse and neglect. Additionally, investigating the consequences of elder abuse in general is difficult given the natural decline in health and increase in disease seen during old age. An increased mortality rate is seen in those reported to adult protective services as possible abuse cases. However, this increased mortality rate is not seen until several years postreport. In 2000, the Elder Justice Roundtable Report described our current medical knowledge of the consequences of elder neglect as approximately three decades behind our knowledge of child neglect. It has been suggested that this may be the result of the current medical forensics system in place. If a child dies of unknown causes, the death is investigated fully. However, an unexplained death in the elderly is rarely put to the same scrutiny.

Medical consequences of elder neglect can manifest in many different ways. Multiple decubiti ("bedsores") are commonly seen in cases of neglect. Decubiti occur from prolonged pressure to certain areas on the body, most commonly from staying in the same position for longer than 2 hours. Malnutrition and dehydration is seen in cases where food and water are withheld. Loss of limb or severe infections can occur when there is a neglect to change bandages or care for wounds. Additionally, a variety of illnesses, and even death, can occur when medications are withheld or given infrequently (e.g., insulin for diabetics). In addition to a marker for physical abuse, burns are also an indicator of potential neglect. A 1998 study at the Fort Sam Houston Burn Unit found that 36% of burn patients over the age of 60 were victims of neglect.

As for psychological consequences, increased rates of depression have been documented in victims of elder neglect, as well as all other forms of elder abuse. Increased rates of alcohol abuse are also seen in neglected elders. Additionally, dementia and psychosis have been shown to be related to elder neglect. However, this is theorized to be more a risk factor for neglect rather than a consequence.

INTERVENTION

The first step to intervention is the identification of those elders being abused or neglected. The reporting of suspected elder abuse is required by law for many professions. Several states have mandatory reporting laws for any individual, regardless of profession, if elder abuse is suspected. Suspected cases of elder abuse should be reported to your local APS agencies. However, it is important to note that some states require that suspected abuse be filed at both APS and local law enforcement agencies.

Intervention can occur from one or several different agencies, such as APS, criminal justice, and the health care system. APS investigates reports of elder abuse and neglect and determines what actions are necessary. Most states require an in-person assessment within 24 hours of a report being made. If abuse or neglect is determined to have occurred, APS is responsible for developing a service plan aimed at removing the threat from the elder and ensuring his or her continued safety. Law enforcement officers may be the first to respond to an initial report of abuse and will notify APS if they believe abuse or neglect has occurred. In addition, criminal action may be taken against the abusive caretaker.

Elder neglect continuing over an extended period of time often results in emergency room visits, the most common point of intervention for the health care system. The difficulty lies in differentiating between elders whose health is failing due to old age and those who are victims of neglect. Specialty health fields, such as forensic nursing, have emerged in response to this need. In sum, it is important to note that the elderly provide important contributions to both the family and community and that aging can occur with both dignity and pride if caretakers are responsive to the increased needs required in old age.

—Jared P. Dempsey, Gary D. Fireman, and Sheila M. Fireman

See also Elder Maltreatment

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ELDERHOSTEL PROGRAMS

Elderhostel was founded in 1975 by Martin Knowles, social activist and educator, and David Bianco, director of residential life at the University of New Hampshire. Knowles had stayed in youth hostels during several years of archaeological expeditions across Europe. He and Bianco discussed the meaningful involvement of Scandinavian elders that Knowles had seen at Scandinavian folk schools. Combining these ideas to challenge prevailing theories of disengagement and social withdrawal in retirement, Knowles and Bianco proposed an "elder hostel" for Americans aged 60 and older. Participants would be housed in unused campus dormitories during the summer while they engaged in 1 week of low-cost classes, field trips, shared meals, and social activities. Noncredit college-level courses in liberal arts and local history would be offered in a nonthreatening atmosphere, with no exams, papers, grades, or previous educational requirements.

Elderhostel's immediate success and rapid growth validated its founding premise that retirees wanted to be productive and creative and that they would welcome affordable opportunities to develop new interests through intellectual and social pursuits. Programs began in 1975 with 220 participants at five New Hampshire universities and colleges. One year later, word-of-mouth brought 2,000 participants to Elderhostel programs at 21 universities in six New England states. In 1980, more than 20,000 people attended programs in all 50 states and Canada. By 1990, Elderhostel was the world's largest education and travel organization for older adults, enrolling more than a quarter-million people in hundreds of programs throughout North America and in 80 countries worldwide.

In 1977 to 1978, Elderhostel incorporated as a nonprofit organization, centralized its program registration and administration in Boston, and hired its first president, Bill Berkeley. Seasonal catalogs were published to meet the increased demand for programs. Elderhostel had been subsidized by corporate and foundation funding and individual donors, but it became fully self-supporting in 1984, less than 10 years after its modest beginning.

Elderhostel, Inc., now operates as a franchise of colleges, universities, parks, museums, and other not-for-profit host institutions that design and conduct programs under its trademark. Elderhostelers age 55 and older stay in hotels, motels, lodges, conference and retreat centers, even on board ships and trains, as they attend programs that range from 1 day to 3 or more weeks in length. Hostelers use their own resources to travel to any of the many individual program sites in the United States, but when the program begins, their Elderhostel tuition covers all lodging, meals, classes, field trips, and related travel until the program ends. Tuition for programs overseas includes round-trip international airfare from a gateway city.

Elderhostel's mission—to provide high quality, affordable, all-inclusive educational opportunities for older adults—encourages innovative approaches to lifelong learning and, while maintaining a basic set of program standards, gives autonomy of design to providers, who then create a variety in programs that reflects the unique history and culture of their local settings. An extensive array of subjects includes liberal arts, ethnic and cultural studies, visual and performing arts, music and dance, and leisure and practical courses. Elderhostel programs offer thousands of topics each year. For example, hostelers might analyze and read poetry, begin a new language, learn the origins and traditions of southwest civilizations, discuss Jewish thinkers, study religious traditions, or research the scientific discoveries made by Lewis and Clark. They might explore Civil War battlefields, learn new dances, investigate politics and policies, or delve into the mysteries of the solar system. Field trips in Elderhostel programs include visits to places such as historic homes, museums, art galleries, plantations, festivals, theaters, city centers, gardens, lighthouses, presidential libraries, national or state parks, mountains, harbors, or barrier islands.

Continuing surveys of older learners' interests and motives have spawned new formats as well. These include intergenerational programs, where hostelers share learning adventures with their grandchildren; active programs for outdoor experiences like mountain climbing, bicycling, kayaking, hiking, and birding; and service programs, which combine learning with volunteering for worthy causes worldwide.

A group of Elderhostelers at Virginia Commonwealth University's program at Natural Bridge

To accommodate increasing numbers of retirees who seek the type of lifelong learning that maintains mental fitness, Elderhostel joined with a number of established Institutes for Learning in Retirement (ILR) in 1988 to form the Elderhostel Institute Network, a voluntary association that exists to facilitate the development of new ILRs and provide resources for established ILRs. Acting as a coordinating center for the Institute programs that already existed, Elderhostel also assisted the development of more than 200 new ILRs over the next 10 years.

Now known as LLIs, Lifelong Learning Institutes are campus- and community-based programs that provide noncredit academic courses and related activities for retired adults. In general, LLIs operate like college programs, but each institute's members determine classes, semester schedules, and organizational governance. The Elderhostel Institute Network continues to provide resources to more than 500 college- and university-affiliated institutes and to facilitate the development of new LLIs across North America.

—Jane F. Stephan

See also Middle Adulthood

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ELECTRA AND OEDIPAL COMPLEXES

During the third major developmental stage described by Freud, called the phallic stage, the child's psychic energy is invested in the genital organs and the pleasure that is received through organ manipulation. It is also during this period that some of the most profound psychological changes in the child's personality development take place.

As children develop a fairly sound identity of themselves as individuals, they are faced with increasingly sharpened conflicts with parents. The child develops feelings that grow in magnitude to form a complex of interrelated emotions and behaviors termed the Oedipus complex for males and the Electra complex for females. The ultimate importance of this stage is in the resolution or working through of these conflicts and the subsequent development of appropriate gender role identification. Freud believes that the entire dynamic process of child-parent interaction and the resolution of Oedipal and Electra conflicts provides the framework for the basic construction of the superego.

Table 1 Psychoanalytical Perspective of the Formation of Gender Identity

	Gender	
	Males	***Females***
Name of conflict	Oedipal complex	Electra complex
Associated anxiety	Castration anxiety	Penis envy
Developmental mechanism for resolution of the conflict	An unconscious fear develops in the male child because of his unacknowledged and unrecognized feelings for the mother. Upon recognition that such feelings are not acceptable, male behavior patterns (such as those displayed by the father) become the acceptable way to vicariously interact with and "possess" the mother.	An unconscious fear develops in the female child because of her unacknowledged and unrecognized feelings for the father. Upon recognition that such feelings are not acceptable, female behavior patterns (such as those displayed by the mother) become the acceptable way to vicariously interact with and "possess" the father.
Result of resolution	Male gender role	Female gender role

The Oedipus complex takes its name and meaning from the Greek tragedy *Oedipus Rex* in which Oedipus kills his father and marries a woman who is, unknown to him, his biological mother. On learning of this transgression, he punishes himself by gouging his eyes out. Freud believes that the desire to possess the mother sexually is characteristic of all males during the phallic stage of development. Parallel to the biological changes that take place during this stage, the male seeks the primary and original love object, the mother, and begins to see the father as a competitive force for the love and affection that only the mother can give. The male child's feelings of inferiority are compounded by the results of a comparison between his and his father's genitalia.

Although the wish to possess the mother physically and psychologically is unrealistic in terms of societal taboos, the male child pursues these irrational desires and eventually is forced to confront his father over who will be the primary recipient of the mother's attention. During this subtle yet profound confrontation, the male child eventually recognizes his father's outrage at his motives and becomes fearful that the father will punish him (through castration) for his incestuous behavior. This fear takes the form of what Freud called the castration complex and specifically results in castration anxiety for the boy. In other words, he fears his father will castrate his sex organs, which are now the focal point of his maturational and psychological growth.

This fear (which remains at the unconscious level) is so strong that the male child eventually abandons these obviously intolerable thoughts about his mother and realizes that the necessary gratification can be obtained only through identification with the father and through the vicarious satisfaction obtained through father-son interaction via mother-father interaction. It is primarily through this process that (1) the beginnings of the superego come into being, because the resolution of the Oedipus complex represents a recognition of societal and tribal mores and values, and (2) the child identifies with his father, leading to successful procreation on the child's part and, indirectly, fulfillment of a very general instinct. The Oedipal conflict is thus resolved.

Freud described a comparable Electra conflict for females but did not elaborate. Many Freudians believe that the process is much more complex for girls than the Oedipal situation for boys. For girls, initially, the young female child does not realize there are any distinct differences between the sexes. Through experience (physical and social/emotional contact with both parents), she realizes she does not possess the same organs the male does. A sense of inferiority over this results in what Freud called *penis envy*. Penis envy amplifies and intensifies her love for and attachment to her father, and there is a corresponding rejection of

her mother. The girl is assumed to unconsciously hold her mother responsible for her lack of a male sexual organ. The dynamics of how gender identity is thought to be formed within the psychoanalytic perspective is shown in Table 1.

However, the girl is thought to realize eventually that the incorporation of a penis is physically impossible and that direct gratification of her desire for one must be channeled into identification with the mother. Freud was much less explicit in detailing the process of the resolution of the Electra conflict than in specifying the course of the resolution of the Oedipal conflict.

The distinction Freud made between the experiences for males and females during the phallic stage of development is often cited as a chauvinistic view. Whereas the male is concerned with the expression of his sexual desires through the manipulation of his genitals, the female is described as being preoccupied with the inferiority of hers. Although both sexes come through the conflict with the same eventual developmental outcome (development of the superego and a gender role), the characterizations of the male and the female through the process have very different connotations.

—Neil J. Salkind

See also Freud, Sigmund; Psychoanalytic Theory; Superego

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ELECTROENCEPHALOGRAM (EEG)

Electroencephalogram (EEG) is a recording of the continuous electrical activity of the brain made by electrodes positioned on the scalp. It has many applications for clinical practice and both basic and applied research. The science of recording, analyzing, and interpreting EEG is part of a larger science called *psychophysiology*, which has its roots in both medicine and psychology. EEG is an important tool in cognitive neuroscience, the field of study that seeks to link human cognition and behavior with specific brain structures and processes. EEG has been used in the diagnosis of epilepsy and other neurological disorders and can also be used as a marker for the presence of numerous developmental abnormalities including, but not limited to, sensory and motor disorders. More recently, EEG has been used to study a variety of biologically based psychological disorders including depression, anxiety, and attention-deficit hyperactivity disorder (ADHD). EEG has also been used experimentally to learn about the cortical mechanisms involved in arousal, vigilance, mood regulation, and even higher cognitive functions such as language and mathematics. With the recent inventions of the related technologies of event-related potentials (ERPs), high-density electrode arrays, and computer-assisted topographic analysis (brain mapping), EEG promises to be a major tool in the neurosciences for years to come.

The biological source of an EEG recording is the postsynaptic membrane potentials of millions of pyramidal neurons that help to compose the human brain, or neocortex. The cells are organized into functional groups called microcolumns, which act as one unit when processing information. Because groups of neurons fire together, their tiny voltages summate and produce enough electrical activity to pass through the resistive mediums of brain tissue, skull, and scalp. Pyramidal cells, named for their triangular shape, are aligned so that their bodies are perpendicular to the surface of the scalp. This orientation means that for cells on the gyri (bumps) and some in the sulci (valleys) of the cortical surface their electrical fields project out to the scalp where they can be recorded.

The basic science underlying the EEG is that whenever an electrical current is passed through a circuit, its amplitude (measured on the y-axis of a graph) can be measured continuously at any point in time (measured in the x-axis) by a device generally known as a galvanometer. Early recordings were made with a few metallic electrodes that were filled with conductive paste and attached to the scalp, with the resultant deviations in voltage plotted with an attached ink pen

on a continuously scrolling drum or sheet of paper. Modern EEG recording is accomplished with multiple electrodes (as many as 256 at once), often positioned with the aid of an elastic cap, and the data are collected and analyzed entirely by microcomputer.

Hans Berger invented the method of human EEG in the 1920s, based upon previous work in animals by Richard Caton in the 1870s. These individuals demonstrated that the brain, like any living system, generates electrical potentials with regular patterns. The dominant patterns are labeled according to frequency and are called delta (.5–4 Hertz [Hz]), theta (4–7 Hz), alpha (8–13 Hz), and beta (13–30 Hz). Berger showed that these patterns are sensitive to both external cues and the internal states of the individual, such as level of arousal. For instance, alpha is present in conditions of relaxed wakefulness and can be suppressed by concentration on a difficult cognitive task. Delta and theta are hallmarks for the deeper stages of sleep, and abnormalities in the frequencies have been demonstrated in children with attention problems, depressed patients, and a variety of other disorders.

—John Shelley-Tremblay

See also Brain Development

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EMBRYO

During the 46-day embryo stage, the embryo grows to a length of more than 1 inch (2.5 cm). By the end of the embryo stage, many body systems will be in operation and the embryo will begin to appear humanlike.

The embryo takes nourishment and oxygen and releases waste products through the umbilical cord, which links it with the placenta. The umbilical cord contains three blood vessels through which the embryo's blood circulates to and from the placenta.

The placenta is a disk-shaped mass of tissue 6 to 8 inches (15 to 20 cm) long and 1 inch (2.5 cm) thick and weighs about 1 pound. Implanted in the inner wall of the uterus, it serves as a two-way filter between the bloodstream of the mother and the embryo. It makes it possible for the mother to carry on life functions such as digestion, excretion, circulation, and respiration for the embryo. Into the placenta, by way of two arteries in the umbilical cord, the embryo deposits waste material such as carbon dioxide.

The mass of blood vessels on the mother's side of the placenta then absorbs the wastes into her bloodstream. The embryo receives, through the vein in the umbilical cord, fresh nutrients (oxygen, amino acids, sugar, fats, and minerals) from the mother's bloodstream and hormones, antibodies, and other necessary substances by the same route.

The placenta is a highly permeable membrane that acts as a natural screen to keep out many—but unfortunately, not all—harmful substances. Thus, the unborn child receives only materials with molecules that are small enough to pass through the screen. At the same time as the embryo is taking shape, the amniotic sac is developing into a protective chamber. By the end of the 8th week, this sac completely surrounds the embryo. The watery fluid inside keeps the embryo from being jostled by any sudden movements of the mother or by accidents that may happen to her, such as a fall or a blow. The amniotic sac also keeps the embryo at a constant temperature.

During the embryonic period, three layers of cells are differentiated. The outer layer, or ectoderm, develops into sensory cells, skin, and the nervous system. The middle layer, or mesoderm, becomes the excretory system, muscles, and blood. The inner layer, the endoderm, forms the digestive system, lungs, and thyroid gland.

By the end of the 3rd week of development, the embryo's heart is beating and its nervous system is forming rapidly. After the 4th week, the legs are curled and the eyes have appeared as dark circles. During the 5th and 6th weeks, arms and legs can be seen. After 8 weeks, all of the major body organs are present. The liver is making blood cells, and the kidneys are removing waste products. The mouth, nose, eyes, and head

are clear and distinct. The head is roughly half the total body size at this time. Fingers and toes are blunt, and ribs show under the skin.

The 8-week time span of embryonic development is a particularly vulnerable period in human growth. The embryo can very easily be affected by chemicals, drugs, hormones, or viruses present in the mother's system.

—Barry R. Behr

See also Fetus, Pregnancy, Teratogen

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EMERGING ADULTHOOD

When does adolescence end? When does adulthood begin? Traditionally adulthood began when education, whether secondary or higher, was complete; the person would begin a career and settle down, starting a family. In recent decades, the transition to adulthood has lengthened as more people have entered college and graduate school and delayed making major life choices in the areas of career, marriage, and parenthood until their mid- to late twenties. The late teens through the mid-twenties has become a period in which people explore and experience changes in love, work, and worldviews and, ultimately, lay the foundation for their adult lives. Recently, developmental psychologist Jeffrey Arnett has described a new phase in development between adolescence and adulthood called *emerging adulthood*.

WHAT IS EMERGING ADULTHOOD?

Emerging adulthood begins with the end of secondary school and ends with the attainment of full adult status—usually running the years from 18 to 25, though for many people it may last through the late twenties. Demographic changes have made the late teens and early twenties not simply a brief transitional period between adolescence and adulthood but a qualitatively different period of human development. Emerging adulthood is characterized by change and exploration of possible life directions, jobs, residences, partners, and worldviews. It is not a universal period of development but exists under certain conditions that have occurred only recently in some cultures.

SOCIAL CHANGES LEADING TO EMERGING ADULTHOOD

Over the past half-century, demographic shifts have taken place that have changed the nature of adolescence and early adulthood. People are getting married later than ever before. In 1970, the median age of marriage in the United States was 21 for women and 23 for men; by 2002, it was 25 for women and 27 for men. Age of first childbirth follows a similar pattern. The advent of the birth control pill in the 1960s and more widespread acceptance of premarital sexuality and cohabitation before marriage also have influenced the rising ages of marriage and parenthood. Additionally, the number of young people who enter college after high school has risen from 14% in the 1940s to 64% in 2003.

These changes have occurred in most industrialized countries, altering the nature of development during the late teens and early twenties in these societies and making emerging adulthood possible. For most individuals in industrialized societies, the late teens and early twenties are no longer a time of entering and settling into long-term adult roles, but a time of exploration and frequent change.

FEATURES OF EMERGING ADULTHOOD

Several features make emerging adulthood distinct from other periods in life. Emerging adulthood is a distinct time of demographic variability and identity exploration and is experienced as different from both adolescence and adulthood.

Demographic Variability

Demographic norms are clear for adolescents and young adults. More than 95% of American adolescents from ages 12 to 17 live at home with one or more parents, more than 98% are unmarried, more than 90% have never had a child, and more than 95% are enrolled in school. By age 30, about 75% of people have married and become parents and fewer than 10% are in school. The time between 17 and 30, however, is a time without demographic norms. Some emerging adults enter college, often attending with stops and

starts, taking more than the traditional 4 years to graduate. Other emerging adults enter the world of work. Most leave home by 18 or 19. Some live in college dorms, others in apartments with friends, others in apartments alone, some cohabitate, some marry, and others live with one or more parents. Variability characterizes emerging adulthood. It is the only period in life in which nothing is normative demographically.

Identity Exploration

The independence from parents, social roles, and adult responsibilities permits emerging adults freedom to explore possibilities in love, work, and worldviews. The process of identity development may begin in adolescence, but identity achievement is rarely reached by the end of high school. Most identity development takes place during emerging adulthood. It is a process of trying on possibilities and exploring alternatives in order to ultimately make enduring decisions.

Emerging adults often seek life experience for its own sake; sensation-seeking behaviors, in which emerging adults seek out new and intense experiences, increase. For example, many emerging adults experiment with a variety of romantic and sexual experiences. Several forms of risky activities peak in emerging adulthood: unprotected sex, most types of substance use, and risky driving. Each of these risky activities can be understood as part of identity explorations; emerging adults seek a wider range of experiences before making choices and settling down into the roles and responsibilities of adult life.

One important focus of identity development is in the area of love. Romantic relationships are more intimate and serious during emerging adulthood. Instead of group dating, popular among adolescents, dating becomes one on one. Relationships tend to last longer, include sex, and often include cohabitation. Similarly, during emerging adulthood, work experiences tend to become more focused on preparation for careers and adult workroles. Emerging adults try on jobs and career contexts to test their fit. It is not uncommon for college students to change majors multiple times, sampling educational paths that would prepare them for various career possibilities. More people are pursuing graduate school—especially as a way of changing career paths after college.

Worldview, another area in which we undergo identity development, also develops and changes during emerging adulthood. During these volitional years, people are open to different perspectives and modify their worldview as they grow, change, and learn about the world. By the end of the college years, most emerging adults have established a worldview that is more complex than the one they held when they graduated high school. By the mid- to late twenties, most people have committed themselves to enduring identities in the areas of love, work, and worldview.

Feeling In-Between

Emerging adults are aware of making the transition to adulthood and of the challenges of measuring up to adult roles and responsibilities. When asked whether they have reached adulthood, the majority of people in their late teens and early twenties will reply, "in some respects, yes, in some respects, no," reflecting their feeling that they are neither adolescents nor adults, but somewhere in-between.

What does it mean to become an adult? The top criteria for adulthood, as rated by emerging adults, are accepting responsibility for one's self, making independent decisions, and financial independence. Each of these criteria emphasizes self-sufficiency. During emerging adulthood, people learn to take responsibility and develop these qualities of character as well as develop the skills and acquire the education and experience to become financially independent. Only after these tasks have been completed do they move into young adulthood; typically this is during the mid- to late twenties. In young adulthood, people are self-sufficient and show more stability in work, family, and personal relationships.

CONTEXT AND EMERGING ADULTHOOD

Emerging adulthood is not a universal stage of development, but a period that exists in contexts that permit it: those that postpone the entry into adult roles and responsibilities until the twenties. Therefore, emerging adulthood generally is found in highly industrialized and postindustrial countries. Not all individuals within a country, however, experience emerging adulthood. Educational and occupational opportunities influence the extent to which the late teens and twenties can be experienced as an experimental and volitional period. Young people from working class and below may have fewer opportunities for the explorations of emerging adulthood than do those with families of higher socioeconomic status. Emerging adulthood is

contextually constructed; it occurs in contexts that permit a gradual entry to adulthood.

SUMMARY

Emerging adulthood is a newly defined period in human development ranging from the late teens through the mid- to late twenties and is characterized by variability in demographics, a quest for identity development, and a subjective sense of feeling in-between adolescence and adulthood. Emerging adults explore and experience changes in love, work, and worldviews, and, ultimately, lay the foundation for their adult lives.

—Tara L. Kuther

See also Stages of Development

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EMOTIONAL DEVELOPMENT

Emotional development comprises the emergence of the experience, expression, understanding, and regulation of emotions from birth and the growth and change in these capacities throughout childhood, adolescence, and adulthood. The development of emotions occurs in transaction with neural, cognitive, and behavioral development and emerges within a particular social and cultural context.

EMOTIONAL DEVELOPMENT IN INFANCY

The expression of emotions during infancy promotes the transition from complete dependency toward autonomy. The expression of interest promotes exploration and cognitive development. Social smiles and other expressions of joy promote social interaction and healthy attachment relationships with primary caregivers. The expression of sadness encourages empathy and helping behavior, and the expression of anger signals protest and discomfort. The infant's unique tendency to experience and express particular emotions and the threshold for expressing these emotions is usually referred to as their temperament or characteristic emotionality. An infant's temperament/emotionality emerges at birth as the infant's genes interact and transact with the environment, particularly through early experiences with caregivers.

Currently, researchers generally agree that the neonatal smile is present at birth and that the social smile and the emotion expression of interest appear as early as 6 weeks of age. By 4 to 5 months of age, infants selectively smile at familiar faces and infants and their caregivers begin to share positive emotional exchanges.

Researchers disagree in their explanations of the development and time of emergence of discrete negative emotion expressions. One group has produced evidence of such expressions within the first 4 to 9 months, whereas others have failed to find discrete negative emotion expressions in the first year of life. Apparently consistent with the view that infants express negative emotions in early infancy, scientists have shown that infants perceive and respond differentially to the negative emotion expressions (e.g., sadness, anger) of others by the age of 4 months.

During the second 6 months of life, as infants gain rudimentary cognitive and memory capacities, they begin to express particular emotions based on context. Emotions begin to emerge dynamically as the infant begins to take more of a directive role in the emotional exchanges with caregivers. The attachment bond with the caregiver is increasingly important as infants engage in social referencing to seek support for exploration and look for signals of danger.

EMOTIONAL DEVELOPMENT DURING TODDLERHOOD AND EARLY CHILDHOOD

During the toddler period, in conjunction with rapid maturation of the frontal lobes and the limbic circuit in

the brain, recognition of the self emerges. As a result, the toddler strives to become more independent and the expression of anger and defiance increases in this struggle for autonomy. The ability to differentiate the self from others also promotes basic empathic behavior and moral understanding. By the end of the second year of life, toddlers respond to negative signals from others and they have specific emotional responses to their own negative actions. The emotions that emerge with a rudimentary conception of the self are often called self-conscious emotions and include shame, embarrassment, guilt, and pride. Some self-conscious emotions, such as pride and guilt, do not emerge until toddlers and young children learn to conceptualize internalized standards for behavior.

As children enter preschool, they begin to label their own emotions and rely on discourse about emotions within the family to facilitate their understanding of basic emotions. Young children first distinguish happiness from negative emotions and then begin to distinguish negative emotions such as sadness, anger, and fear from each other. They begin to recognize these emotions in facial expressions then, as they enter middle childhood, begin to understand situational determinants of emotions. An understanding of emotional subjectivity also develops as children learn that what makes one child happy may not make another child feel the same way.

The emergence of emotional self-regulation is particularly important during early childhood and occurs in the context of family and peer relationships. Open expression of positive emotions and warm, supportive relationships between parent and child promote effective emotional self-regulation. On the other hand, frequent expression of negative emotions in the family and harsh, punitive discipline responses increase the experience of distressing and dysregulated emotions that may lead to psychopathology. Appropriate peer relationships characterized by shared play activities are also important for the development of emotion regulation during early childhood. Children gain emotion understanding and the capacity for empathic and helping behavior from well-regulated emotional exchanges with peers.

EMOTIONAL DEVELOPMENT DURING MIDDLE AND LATE CHILDHOOD

During middle and late childhood, stable self-concepts emerge based on the child's typical emotion experiences. With the increased capacity for self-reflection, children gain an understanding of their self-conscious emotions. As a result, the consistent experience of patterns of self-conscious emotions has an impact on the child's self-concept. For example, the tendency to experience shame rather than guilt in response to negative transgressions affects the child's emergent self-esteem and tendency to respond with aggression or violence.

Also during middle and late childhood, children begin to understand that a single situation or event can lead to the experience of multiple, mixed emotions. For example, older children understand that a goodbye party for a sibling who will leave for college is likely to be both a happy and a sad event for the child and his sibling. This capacity likely emerges with the cognitive capacity to understand multiple aspects of a situation, called decentration.

Children also learn emotional display rules as they progress through middle and late childhood. For example, a child learns to look happy even though she feels upset when a friend or family member gives her an undesirable gift. The use of display rules tends to increase as children begin to consider what consequences their actions may have for others. Display rules are used judiciously, and the likelihood of suppressing negative emotion depends on a number of factors including the child's gender, the likely recipients of the expression, the specific context, and the child's cultural milieu.

EMOTIONAL DEVELOPMENT DURING ADOLESCENCE

With adolescence comes an additional struggle for autonomy and increased time spent with peers and less time spent with the family. Adolescents become less emotionally dependent on their parents, but this emotional autonomy often emerges after a period of conflict and increased experience of negative emotions. Young adolescents often experience more negative affect than younger children, but the negative affect often decreases during the high school years. However, girls often experience a longer period of elevated negative affect than boys. Adolescents tend to experience more extreme emotions, both negative and positive, than their parents even in response to the same event.

The rise in negative emotion experiences during early adolescence emerges in conjunction with the capacity for abstract thinking. Adolescents often experience emotional distress in response to ambiguous and imagined romantic exchanges, and their capacity to

experience complex and diverse emotions further promotes the development of abstract thinking. As adolescents grapple with increasingly abstract and complex social problems, they often seek a stable peer group as the context for emotion management. Positive peer relationships emerge from the recognition of equality and the tendency to offer emotional support. Adolescents that are not accepted by their peers face numerous risks including school dropout and participation in delinquent activities. Even adolescents who are accepted by peers and have close friends often show an increase in negative emotions such as anger and anxiety in the peer context during adolescence. Overall, positive and supportive peer relations during adolescence promote healthy emotional development and mental health as the adolescent enters adulthood.

Dating relationships also become prominent during adolescence, but young adolescents may still have difficulty understanding that one person can evoke different and conflicting emotional responses. Therefore, dating during adolescence is often characterized by intense emotional lability. Dating partners are also prone to experience jealousy, particularly when they make errors in determining the intent of their partner's actions.

Identity development is important for adolescents as they approach adulthood. When the adolescent or young adult is exploring many identity options, they often have high levels of anxiety but show interest in exploring these options. Adolescents who make an early commitment to a particular identity, usually an identity promoted by their family, have low levels of anxiety and do not experience much conflict in their family relationships. Adolescents who are not exploring identity options tend to have low levels of motivation and often appear bored or apathetic. They have poorer peer relationships and are at greatest risk for mental health problems during adulthood. Finally, young adults who have achieved a stable sense of identity tend to be more empathic and are more successful at managing their emotions.

—Christopher J. Trentacosta and Carroll E. Izard

See also Multiple Intelligences

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EMOTIONAL INTELLIGENCE

Emotional intelligence is a relatively new concept within the psychological community and was introduced to the general public by Daniel Goleman's 1995 popular publication, *Emotional Intelligence: Why It Can Matter More Than IQ.* Emotional intelligence, also known as EQ or EI, is characterized as the psychological faculties used to identify, understand, and apply personal and interpersonal feelings. In other words, EQ refers to the ability to understand and manage feelings. Individuals' emotional intelligence facilitates and guides their comprehension and control of appropriate emotional responses across various life situations. It is suggested that high EQ individuals are skilled in identifying and dealing with emotions—both their own and other people's. Ultimately, it is suggested that the possession of emotional intelligence permits the successful use and management of social and communicative skills. Thus, EQ provides the answer to the question: "How could someone so smart be so bad with people?" The deficit lies not with lay person's concept of common sense but rather, technically, with emotional intelligence.

HISTORY OF EMOTIONAL INTELLIGENCE

The first formal definition of emotional intelligence was formulated by the academic duo, Peter Salovey, PhD, of Yale and John Mayer, PhD, from the University of New Hampshire, as they deliberated about the intermingling of emotion and intelligence: "We define emotional intelligence as the subset of

social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (1990, pp. 185–211). Their work pioneered and led to the general consensus that there are four basic abilities comprising emotional intelligence. These are the ability to

1. perceive or sense emotions;
2. use emotion to assist thought;
3. understand emotions; and
4. manage emotions.

Incorporating these elements into their definition, EQ experts Bar-On and Parker (2000) more recently defined emotional intelligence as *"a multifactorial array of interrelated emotional, personal and social abilities that influence our overall ability to actively and effectively cope with demands and pressures."*

DEVELOPMENT OF EMOTIONAL INTELLIGENCE

The etiology of EQ, how it is developed, has yet to be empirically determined. The only definitive conclusion made at this time is that parents who have high EQ also have children with high EQ. Either socialization/parenting practices and/or genetic factors may account for this finding. It is also unknown whether gains found in children in the area of EQ are actually attributable to any specific interventions or training, for example, education in recognizing and understanding emotions, or whether such gains are part of naturally occurring cognitive and social advances as children develop.

MEASUREMENT OF EMOTIONAL INTELLIGENCE

Emotional intelligence has been measured in many ways but primarily has been conceptualized as either an ability or a trait. Two particular tests frequently used to measure emotional intelligence exemplify this difference. The pioneers of the concept of emotional intelligence itself, Mayer, Salovey, and Caruso, developed the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), which conceptualizes and measures emotional intelligence as an ability or a group of emotion-processing skills. The MSCEIT's scales measure emotional perception (ability to identify emotions), emotional facilitation (ability to translate feelings into emotion), emotional understanding (ability to define complex emotions), and emotional management (ability to effectively include emotion in decision making). For example, a test item might ask an individual to look at a picture of a face and then using a rating scale indicate how that person is feeling. Gender differences on ability-based measures of EQ have been found. Women tend to perform better than men on all four scales of the MSCEIT.

A second commonly used measure of emotional intelligence is the BarOn Emotional Quotient Inventory (BarOn EQ-i) (1997, 2000) created by Reuven Bar-On. This instrument conceptualizes emotional intelligence as a trait and, as such, uses a trait-based approach to measuring it. The BarOn EQ-i is a 133-item self-report measure in which individuals provide self-ratings on categories such as their intrapersonal and interpersonal characteristics, adaptability to stress, stress management through problem-solving methods, and methods they apply to manage mood through self-control and conscientiousness. In lieu of self-report ratings such as those used with the BarOn EQ-i, multiperspective ratings have also been developed to measure emotional intelligence. This method involves having a person's emotional intelligence rated by numerous people well known to the individual such as family members, friends, and employers/colleagues. The results are compiled and said to provide a more objective rating of the individual's EQ.

APPLICATIONS

When Daniel Goleman, a Harvard PhD psychologist, expanded Salovey and Mayer's academic work on emotional intelligence into the mainstream, emotional intelligence began to gain recognition and widespread use in applied settings as well, particularly in the occupational environment. The EQ concept argues that traditional intelligence (IQ) is too constricted to be the primary predictor of success, and EQ may be able to account for a wider range of abilities that lead to successful work performance. Goleman's research sought to differentiate the impact of cognitive and noncognitive abilities on performance. Goleman also proposes that EQ, unlike IQ, can be learned. In his model for developing EQ, Goleman describes five "domains" of EQ that are trainable:

1. Knowing your emotions
2. Managing your own emotions
3. Motivating yourself
4. Recognizing and understanding other people's emotions
5. Managing relationships, i.e., managing the emotions of others

Current research on EQ in the workplace suggests that compared to low EQ coworkers, high EQ is linked to increased job performance, reduced turnover, and stronger leadership and managerial ability in employment settings. High emotional intelligence has also been found to predict employability. High EQ has also been linked to stronger academic performance and also to general interpersonal behaviors and interactions such as sportsmanship, helping behaviors, and civic involvement.

EQ has been applied to the study of stress and health as well. For example, in adolescents, high EQ has also been found to serve as a protective factor against teenage smoking; and it is suggested that adolescents high in EQ benefit more from prevention programs. Along with concepts such as positive and negative affectivity, optimism, and locus of control, EQ is considered influential in the way that individuals perceive, evaluate, and respond to stress. Research to date finds that workers with high EQ experience less stress and have better levels of health than their moderate to low-scoring colleagues.

EQ has been hypothesized to have potential future implications in clinical work as well. For example, the presence of pathologically low emotional intelligence (PLEQ) may have an important impact in relation to diagnosis, conceptualization, and treatment of emotional disorders. Because it is believed that EQ can be learned and developed via education and experience, emotional intelligence training programs have been established internationally. These programs report that for some individuals, EQ is strengthened through developmental training, thereby improving the health, well-being, and/or performance of the trainees. Additional program evaluation is needed to fully support such claims.

Critics of the emotional intelligence construct note that EQ, as it is currently conceptualized and measured, demonstrates limited incremental utility and predictive value over and above existing traditional intelligence and personality measures. Yet, many believe that the construct of EQ holds much promise, and almost all agree that it is in need of further empirical investigation. Goleman and others purport that EQ, in fact, predicts work and life success. High EQ is said to promote high achievement in life. Research is needed to fully substantiate such powerful statements, yet the construct of EQ holds much promise and infinite research opportunities.

—Lacy Allen and Karen Mottarella

See also Multiple Intelligences

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EMPATHY

DEFINING THE CONCEPT

The term *empathy* was originally coined in 1909 by E. B. Titchener who, drawing on the work of Theodore Lipps, employed it in his *Experimental Psychology of the Thought Processes* as a translation of the German word *Einfühlung,* a technical term in German aesthetics that literally means "to feel one's way into." For Lipps and other scholars interested in studying the emotional responses people have to works of art, *Einfühlung* was employed to explain how people were able to grasp the meaning of aesthetic objects and the consciousness of others. For Titchener, however, empathy referred to an instinctive tendency we have to feel ourselves into the things we perceive or imagine. This early characterization has continued to shape theoretical conceptualizations of empathy to the present day with its acknowledgment that empathy has both affective and cognitive components.

Although widely recognized as a fundamental feature of human social life and moral development, social scientists since Titchener have had difficulty forging consensus regarding a precise and comprehensive definition of empathy and the relationship between its affective and cognitive aspects. Traditionally, the research literature on empathy has been marked by sharply conflicting, even mutually exclusive, conceptualizations of the meaning and nature of the phenomenon, as well as significant disagreements about how it is to be measured or studied. Some authors have made the case that empathy is primarily a cognitive process involving the skill of perspective- or role-taking; others have argued that empathy is a vicariously shared emotion that does not necessarily involve the higher mental processes; still others have attempted to reconcile these two perspectives somewhat by arguing that while it can occur without perspective-taking, the likelihood of empathic response increases in the presence of perspective-taking abilities and skill. Further complicating matters is the fact that clinicians tend to view empathy as a therapeutic technique or process that facilitates effective communication and promotes deepened therapist-client understanding. Ultimately, there may be no one correct or final definition of empathy, just different working definitions.

EMPATHY, ALTRUISM, AND MORAL DEVELOPMENT

Many researchers have attempted to establish the theoretical and empirical relationship between empathy and altruism, as well as to differentiate between empathy and similar emotional phenomena such as affective role-taking, sympathy, personal distress, and compassion. For example, it has been argued that affective role-taking takes place when we identify with the feelings of another, while sympathy occurs when we respond to another's negative emotional state in ways that are not identical to but nonetheless congruent with that person's feelings; personal distress is the result of self-oriented anxiety or concern over another's feelings. Speaking to the relationship between compassion and empathy, Post (2003) maintains that "compassion requires empathy and seeks to achieve good in the context of suffering." In the minds of many researchers, the basic experience of empathy, an experience of sharing another's emotional state in one way or another, seems to underlie and possibly give rise to each of these other phenomena. One way in which the specific differences between empathy, sympathy, personal distress, and compassion may be made more clear is by considering empathy as "feeling-with" another person, sympathy as "feeling-for" them, personal distress as "feeling-for-oneself" because of another person, and compassion as "suffering-with" another who is in need. Although this may be a bit simplistic, it is nonetheless a useful heuristic when considering the often subtle distinctions to be had in this particular family of emotional experiences.

Empathy, as a basic conceptual and explanatory construct, has long been employed in social, developmental, and personality psychology. Early in the history of modern psychology, James Baldwin employed the term *ejective consciousness* to characterize the role that empathy plays in the moral development of young children. Later, Piaget proposed that the capacity for empathy was tied directly to the child's development of the cognitive ability to adopt another person's perspective, both of which were fundamental to the development of moral judgment in the child. Following Piaget, Kohlberg (1981) maintained that our role-taking tendencies and our fundamental sense of justice are deeply interwoven and, as such, are closely related to the experience of sympathy and the desire to resolve conflict.

This connection between empathy and moral development has continued to be a central focus of much contemporary research. Some researchers have suggested that an innate capacity to share and respond to the emotional expressions of others may be present from birth. This conclusion is partly based on research indicating that, even when they are only a few hours old, infants are disturbed by the sounds of another infant's distress in ways that they are not disturbed by other sounds—even their own cries. Other researchers have argued that empathy and altruism are just as much a part of basic human nature as selfishness and aggression. It has also been suggested that this natural predisposition to empathic responsiveness ultimately may be what provides the foundation for later development of abstract moral principles such as caring and distributive justice. Indeed, evolutionary theorists have long held that our abstract systems of moral reasoning, ideals of distributive justice, and egalitarian ethics are the result of natural selection and ultimately function to ensure the survival of the species. Although such claims have often been met with strong criticisms (both empirical and philosophical), they nonetheless demonstrate a fairly general recognition of the intimate relationship between empathy and the development of moral sensibilities.

Of similar interest to many researchers has been the relationship between empathy and the development of emotional understanding in young children, in particular young children's abilities to interpret accurately the emotional expressions of others. Much current research indicates that infants and young children are naturally responsive to the emotional expressions of others and are highly motivated to read and understand others' feelings. In this view, the emotional expressions of others provide the young child with important clues about the social world in which they find themselves, thereby helping to enable the child to learn how to react appropriately to the diverse and often changing demands of human social life. For example, the ability to accurately appreciate emotional expressions that convey alarm or distress are obviously important in eliciting arousal and attention in the young child and are therefore quite relevant to the child's personal safety and security. Research in this area also suggests that, contrary to what has often been assumed, infants and young children are not fundamentally egocentric organisms and passive receptors of environmental information, but rather are quite active beings who are very sensitive to the varied and subtle emotional expressions of others in their social world.

DIFFERENCES IN EMPATHY

Despite the fact that empathy is so basic to human nature, research has shown that not all people experience empathy in the same way or to the same degree—even in the same situations. Indeed, the spectrum of empathic experience extends from those deeply sensitive individuals who feel intense distress in the face of another's suffering to those rare individuals (sociopaths) who seem incapable of appreciating any emotional states other than their own. Typically, though, most people are capable of empathizing with others, and do so to a significant degree—assuming, of course, that they themselves are not experiencing too much distress of their own or are not able to accurately perceive a given situation. This does not mean, however, that human beings are automatically or necessarily empathic toward others. Although there are times when empathy just seems to happen and we experience another person's world without really trying, it is also the case that we seem quite able not only to choose to empathize with another but also to choose to resist such feelings. Although much work in this area remains to be done, it seems clear that the ability to choose empathic response or to resist empathic feelings is far more defined in adulthood than in either childhood or adolescence.

Although there is no evidence to suggest that empathy is in any way a gender-specific emotion, there may be gender differences in the experience of empathy. Some research indicates that women tend to experience and manifest a greater degree of empathy than do men in most situations. For example, Anderson has shown that among non-Jewish Germans who rescued Jews from the Nazis during the Holocaust there is a two-to-one ratio of female to male rescuers. Research also indicates that females are typically better able than males at accurately identifying the meanings of nonverbal emotional cues, which is presumably an important requirement for empathy. Other researchers, however, argue that gender differences in empathy may have less to do with genetics per se and more to do with differences in the types of socialization males and females experience. Thus, empathy may have different meanings and consequences for males and females. For example, it has been shown that in boys empathy tends to correlate with cognitive skills, whereas in girls it is more often correlated with a positive self-concept and prosocial behavior. Several large scale reviews of research in this area suggest, however, that although females tend to appear more empathic when empathy is measured by asking people to rate themselves, gender differences all but disappear when either physiological change or facial expression is employed as the principle measure of empathic arousal. Such findings seem to imply that what might appear at first glance to be gender differences in empathy may in fact only be artifacts of the methods of measurement employed in the research. What does seem clear, however, is that empathic sensitivity in both males and females can be enhanced or weakened by having (or not having) certain key experiences, particularly during childhood and especially those involving positive socialization, parental examples of affection and generosity, and frequent opportunities to learn about, cooperate with, and assist others.

—Edwin E. Gantt

See also Emotional Development

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EMPTY NEST

The "empty nest" refers to the physical and psychological change in the family when a child leaves home or goes away to college. For about 18 years, parents have invested themselves in the emotionally consuming process of raising a family—and suddenly one day the children leave home. As the nest empties, a chapter of parenting draws to a close, often accompanied by ambivalent feelings from both children and parents. The empty space that opens up in parents' lives can be both exciting and frightening.

Many parents experience deep grief as they prepare to let go of their sons or daughters and the family as they have known it. There are multiple losses including the loss of daily life with children, loss of the sense of family that the parents have built, and loss of the active job of parenting ("I'm out of a job." "I'm no longer needed."). These losses can play havoc with a parent's self-worth, particularly if that parent's identity has revolved around child rearing. Grief can be especially deep if it is the first, last, or only child to leave home, if the relationship with the child was especially close, if the child played a critical role in the family, or if there have been other recent losses. This major life passage can coincide with middle age, menopause, and caring for aging parents, as well as issues around finances. It can also bring to light unresolved family, marital, or personal issues that had been put aside while parenting.

Often marriages go through major adjustments after children leave home, as time and energy are freed up from parenting and partners are left alone in the house with each other. Marital relationships have often suffered from lack of attention, intimacy, and nurturance throughout the child-raising years. The adolescent years can severely strain a marriage as well, with the lack of privacy, increased sexuality present in the house, and disagreements between parents about parenting. It is common for long-term problems in the marriage to surface. As partners find themselves alone with one another in a house without children to distract them, marriages often come under scrutiny. This can be an important time to become reacquainted with one another, confront long-term relationship issues that now have the space to surface, and co-create new dreams and projects. It can also be a time when partners find that they have very little left in common; many marriages at this juncture end in divorce. Couples who wait until the children leave home to deal with the long-term problems in their marriages run a much greater risk of divorce.

Parents are challenged to let go of the child they protected and nurtured through childhood. As the young adult is now being launched into the world, parents must assess the job they have done. Parenting is a humbling and challenging experience, and it is rare for a parent to have no regrets. Parents are faced with the reality that they will not have a second chance and that they have prepared their children as best they can. Now it is time to let go of their children. Often the relationship has suffered from the inevitable conflicts of the teen years, and parents may feel a mixture of relief and regret that their son/daughter is leaving home. Parents also know that the relationship is changing; once that child has left home, the relationship will never be what it had been, even if the young adult returns home for a period of time. The parent-child relationship at this stage is much like a dance in which the parents have to be ready to step back as the child steps forward, without stepping back too quickly, as the child may fall. The dance of

supporting children through this transition is a delicate one, needing timing and sensitivity.

It is difficult to predict how the young adult will move through this transition; it can be a rocky time for both parents and children, with the tension straining the parent-child relationship. As they leave home, young adults are struggling with the developmental tasks of searching for identity and independence. They are saying goodbyes, focusing on their futures, and struggling with questions ("Who am I, apart from my family and school?" "What do I believe in?" "What do I want to do with my life?") and self-doubts ("What if I get homesick?" "What if I chose the wrong college?" "What if I don't find new friends?"). Many feel ambivalent about leaving home and have fears about the change in the relationship with their parents ("Will they still love me if I don't make choices they agree with?"). Young adults may feel conflicting pulls between remaining loyal to the family (and its values) and wanting to break free and discover their own beliefs, feelings, talents, and needs. In an attempt to find their own identities and place in the world, over the next few year these young adults will be confronting and reassessing parents' values, lifestyles, and relationships—with an ever-widening gap between their experiences and the world of their parents. Some children may need to return home for a period of time. This can create stress as the family attempts to readjust while parents and boomerang children deal with feelings of disappointment or even shame.

Children who are leaving home benefit from knowing that parents are dealing constructively with the empty nest and knowing that parents are seeking to find new meaning, intimacy, and possibilities in this new phase of their lives. It is much more difficult for children to leave if parents are unhappy. As parents face the empty nest, they are challenged to re-create their lives and remodel the family system in such a way that it nurtures the newly defined needs of the parents/partners, along with a new relationship with children that embraces, supports, and appreciates them as adults.

Following are some suggestions for parents who are experiencing empty nest:

- Acknowledge the importance of this life transition. Your family is changing, as is your relationship with your child. If you can tend to your own feelings of loss, you can support your child in his/her awkward steps toward independence.

- Get the support of your friends and partner. Reassure them that they do not have to make you feel better; they can just be with you. Consider starting or joining a mothers support group.

- Review your relationship with your child—what you regret and appreciate, what you left out of your parenting, what you have given your child, what you have learned about yourself. Be willing to honor this phase of your mothering, perhaps through a ritual.

- Make room for the differences in how your family members will deal with this change. Be willing to let go of your expectations and open to things as they are.

- Take time to regularly communicate with your family members about the upcoming changes. Listen to your child; acknowledge his/her fears and anxieties while keeping the bigger picture in mind. Understand that the pressure of separation may strain your relationship and that this may be a time of increased arguing.

- Communicate with your spouse about the changes you both are experiencing in your marriage. Some couples find that they have neglected their marriage while they were raising their children; it is common for long-term problems in the marriage to surface at this time. Many couples find this to be a good time for marriage counseling.

- Explore who you are in the world after your child leaves home. Be open to the emptiness and the possibilities within it. Explore new questions about the direction of your life. Give yourself permission to dream; cultivate interests you may have set aside during your parenting years. Set a goal to initiate at least two new ideas within the first few months after your child leaves for college.

—Alexandra Kennedy

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ENDOCRINE DISRUPTORS

Endocrine disruptors are chemicals that disrupt the normal functioning of hormonal systems or the

balance of hormones. There are currently no standardized tests to determine whether or not a chemical should be classed as an endocrine disruptor. Chemicals that alter either the levels of estrogens, androgens, or thyroid hormones or the body's response to them are of special concern because these hormones are very important during development. Laboratory studies show definitively that certain chemicals can have adverse effects on hormone function, which, in turn, produces birth defects, developmental abnormalities, reproductive dysfunction, and cancer. Whether the environmentally ambient concentrations of endocrine-disrupting chemicals create developmental dysfunctions or cancer in humans is still a subject of debate.

There is little debate that wildlife can be affected adversely by endocrine disruptors at ambient concentrations. The classic example is the decline of populations of bald eagles and other birds in the United States. The population decline was reversed after the phase-out of DDT. There are many other examples. Recent laboratory studies have found that amphibian gonad development is altered by the herbicide Atrazine at extremely small concentrations, and other studies have shown that sexual development in fish is negatively affected by estrogenic chemicals found in sewage treatment discharges.

Endocrine disrupting chemicals that act on hormone receptors pose problems for standard toxicology experiments that use high doses and linearly extrapolate the effects to lower doses. The adverse effects to an organism of a hormone or endocrine disruptor are often an inverted-U function; when concentrations are above or below an optimal level, adverse effects occur. Examples are vitamin A (and other retinoids) and thyroid hormone.

A report by the National Research Council concluded that there is evidence that PCBs and the chemicals that accompany them in the environment (dioxins and furans) are correlated with shorter gestation, slower growth, and lower IQ test scores. The panel of scientists could not agree about the source of historical changes in sperm counts, the possible increase in hypospadias (opening of the urethra on the underside of the penis) found in people near toxic waste respositories, and a possible increase in undescended testicles. However, laboratory studies of a number of species of mammals, including monkeys, yield evidence that a variety of endocrine-disrupting chemicals (including DDT, methoxychlor, bisphenol-A, PCBs, dioxins, and dibutylpthalate) induce structural and functional reproductive changes. Some of these chemicals also appear to suppress immune function in wildlife and laboratory animals.

The National Research Council committee recommended that epidemiological studies be conducted to examine the effects in humans of endocrine-disrupting chemicals that have been shown to affect laboratory animals. The outcomes to be assessed should depend on the outcomes observed in laboratory animals for the specific chemicals. For different chemicals, the outcomes would be reproductive system structure and function, developmental defects, neurobehavioral functioning and social development, immune system, and different types of cancers. Because of the widespread contamination of the environment by endocrine-disrupting chemicals, the committee also recommended the development of assays that will rapidly screen and identify chemicals with potential endocrine disrupting activity, and that the sensitivity of the fetus to delayed effects of such chemicals be considered in developing such assays.

—Colleen F. Moore

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ENGLISH AS A SECOND LANGUAGE (ESL)

English as a Second Language (ESL) is a program in which nonnative speakers of English who live in a country where English is the native language work toward the acquisition of English as a second language. It is referred to as ESL even though English may be the student's third or fourth language. When English is taught as a second language in a country where the predominate language is not English, the program is referred to as English as a Foreign Language, or EFL.

TYPES OF PROGRAMS

There is a variety of models for ESL instructional programs including Pull-out ESL, Push-in ESL, Self-contained ESL, Sheltered instruction, or SDAIE (Specially Designed Academic Instruction in English), and Newcomer schools. Pull-out ESL programs consist of an ESL teacher who removes children from the mainstream classroom during the day for a limited amount of time and works with them on English language development skills. Push-in ESL programs are mainly used in the elementary grades where there is a small population of English language learners. In these programs, the English language learners remain in the mainstream classroom and an ESL teacher visits the classroom to work with the students and the classroom teacher. Self-contained ESL is found in schools with large populations of English language learners, and the students are grouped into one classroom to learn English skills. English language learners are also grouped together for SDAIE. In this setting, the teacher uses ESL methods to teach students content area materials such as mathematics, English, history, and science. Sheltered instruction techniques may also be used in the mainstream classroom by a grade-level teacher who has had special training. Bilingual education programs focus on dual-language instruction such as Spanish and English. Whereas all bilingual models have an ESL component, all ESL programs are not bilingual.

Newcomer schools are sometimes used to bridge the gap between students' native backgrounds and their new environments. Students who are usually placed in these programs are generally new to the school system, are non-English speaking, or have a limited ability in English. The school provides instruction in language and content to English language learners to help them make the transition to their new environment. After a certain length of time, the English language learners are moved into the mainstream school.

English language learners come from a variety of backgrounds. Some have been well educated in their native country, and some have had little or no schooling. Older English language learners have more of a challenge because although a student may be able to communicate well in English within 6 months to 2 years, the development of academic language may take from 5 to 7 years.

The problem of how to teach students who do not speak a common language and what that common language should be creates a challenge in a multicultural society. Bilingual education in the United States has been alternately embraced and rejected. For English learners, English-only schooling has often brought difficulties, cultural suppression, and discrimination, even as English has been touted as the key to patriotism and success.

HISTORICAL BACKGROUND

English as a Second Language has been a part of the history of the United States since Colonial times. Even at that time, the colonies were a mixture of many different nationalities and languages. As the colonies grew, there became a need for a sense of unity, so the leaders began to work for national literacy. Many of the colonies formed schools of their own in which the native languages of the colonists were utilized, but eventually many of these schools became English-speaking. Although Colonial government could not prevent groups from forming schools of various languages, early colonial leaders such as Benjamin Franklin stressed Americanization though education and the teaching and preservation of the English language to strengthen the government. This idea was strengthened with the American Revolution, which emphasized building common bonds and loyalties to build the new nation.

In 1664, at least 18 Colonial languages were spoken on Manhattan Island. Bilingualism was common among both the working and educated classes, and schools were established to preserve the linguistic heritage of new arrivals. The Continental Congress published many official documents in German and French. Early laws in the new nation, such as the Ordinance of 1787, mandated common schools in all of the Northwest Territories. Since this population of settlers included people who were from several European and various other countries, the task of creating common schools was a challenge. Parochial schools for various groups were common in these territories, which prevented some groups from automatically becoming a part of the common culture. Another challenge for the schools was that many of the immigrants were poor and had never attended school or learned to read in any language.

The Territory of New Mexico authorized Spanish–English bilingual education in 1850. The inclusion of a language other than English in the public schools was encouraged by the large population of Germans in

1865, although it was opposed by other ethnic groups. The Chicago School Board agreed to German being taught and, by 1870, 1 in 15 students was receiving instruction in German. Other cities, such as St. Louis, also supported German instruction. As the political power of the German groups decreased, the amount of German instruction in the schools also decreased. The immigrant population changed as immigrants arrived from southern and eastern Europe. Many of the newcomers were illiterate in English as well as their native language. The Compulsory Education Law of 1889 mandated English-only instruction and mandatory school attendance. Many large cities looked to the schools to assimilate immigrants into the mainstream culture, a difficult task for the unprepared schools. Employers also encouraged English language learning to create better educated workers.

In periods of recession, war, or national threat, immigrants, cultures, and languages were restricted and/or forbidden. The diversity of languages in America was further emphasized as World War I began, and the draft registration announcement was repeated in 15 languages. The German-American communities' demands to German instruction in the schools ended as the United States entered WWI and Congress placed language limitations on material printed concerning the war. World War I brought anti-German hysteria, and various states began to criminalize the use of German in all areas of public life. As World War I ended, Ohio passed legislation to remove all uses of German from the state's elementary schools; mobs raided schools and burned German textbooks. In 1917, a new law was enacted to give a literacy test to immigrants. Immigrants were encouraged to learn English so they could learn the laws of the Untied States and become a part of the American culture. Subsequently, 15 states legislated English as the basic language of instruction and uneasiness toward immigrants continued. Although there were several pockets of acceptance for bilingual education, other areas of the country effectively restricted or even attempted to eradicate immigrant and minority languages. This repressive policy continued in World War II when Japanese-language schools were closed.

ESL and bilingual programs continued to be issues in the political arena. Only as recently as 1968 did Congress signal its first commitment to bilingual education by enacting the Bilingual Education Act as a means of addressing the needs of students whose first language was not English. When the U.S. Congress enacted legislation to begin Title VII of the Elementary and Secondary Education Act, federal funding became available for bilingual education programs. Almost simultaneously, the courts began to rule that students deprived of bilingual education must receive compensatory services. Beginning in 1970, landmark court cases mandated special language instruction for children with a limited command of English, including a U.S. Supreme Court decision in 1974 citing that Chinese-American children were not receiving adequate education in San Francisco due to the language barrier. However, federal legislation, through continuing reauthorization of the 1968 Bilingual Education Act, has supported the rights of states to restrict bilingual education as seen in Arizona's Proposition 203 in 2000 and California's Proposition 227. Proposition 227 passed overwhelmingly in California on June 2, 1998. The initiative essentially banned bilingual education and called for sheltered English immersion. Students were to be immersed in English for 1 year and then put into regular classes. This program had no research base; it had never been tried elsewhere, but the idea was appealing. The concept was to give students 1 year to learn English and then let them continue with their education.

Periodically throughout history, English has been proposed as the national language such as through the bill titled "Declaration of Official Language Act of 1999," yet this has never been enacted into law. Although the United States has no official language, 23 states have passed laws proclaiming English as official. Because the states reserve the right to dictate educational policy, bilingual education has depended on the vagaries of state law.

METHODS

Over the years, the methods of teaching second or foreign languages have changed a great deal. Emerging research and philosophical debates have greatly affected the study of how students learn and how a second language is acquired. In second language teaching, methods have moved from teacher-centered approaches to learner-centered approaches that emphasized the student as a whole. Methods have also moved from an emphasis on linguistic competence and grammar structures to communicative competence and learning strategies. Language learning is no longer seen as simply an academic subject to be learned. It is now an act that can transform a person and offer independence.

Communicative approaches, which stress language learning for the purpose of oral and written instruction,

differ from structural approaches, which focus on the structure of the language such as grammar and syntax. Several communicative approaches appeared between the 1960s and 1980s. These approaches reduced emphasis on grammatical structures and recognized the range of language functions and the appreciation of language as embedded in social contexts. Through communicative approaches, teachers and students work collaboratively.

Adult ESL programs use different approaches to language learning depending on the goal of the instruction. Structural approaches are used when the students are preparing for the TOEFL (Test of English as a Foreign Language) for college admission. Communicative approaches are used to train students for social or employment settings.

—Joy L. M. Brown

See also Language Development, School

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EPILEPSY

Epilepsy is a medical condition characterized by spontaneous recurrent seizures. Seizures are brief neurological symptoms resulting from abnormal discharge or "firing" of neural brain cells in the cerebral cortex. Neurons normally transmit information by firing a single short discharge that is conducted from one neuron to another. Seizures result when the discharge is prolonged or recurs rapidly and recruits other neurons. The synchronous discharge of neurons causes excessive expression of the activity normally performed by the discharging brain region.

The symptoms caused by a seizure are determined by the brain region involved. *Simple partial* (or *focal*) *seizures* result from discharge of a small brain region. Seizures arising in the frontal lobe primary motor cortex cause motor seizures. This region contains the neurons of motor control that are eventually connected to muscles in the arms and legs; a seizure arising in the hand region of the primary motor cortex causes jerking of the opposite hand. Simple partial sensory seizures arise in the parietal lobe primary sensory area and cause abnormal sensations. Seizures arising in the occipital lobe primary visual area cause visual symptoms.

Complex partial seizures are the most common seizure type in adults. They most often begin in the temporal lobe, which is normally responsible for memory. They are characterized by 1 to 3 minutes of nondistractible staring, often with automatisms of manipulating objects or lip smacking, and are followed by confusion and amnesia for the event.

Generalized tonic-clonic seizures, previously termed grand mal or convulsions, are characterized by sudden unresponsiveness, whole body stiffening (tonic phase), and falling to the ground. This evolves to typically less than 3 minutes of rhythmic muscle jerking (clonic phase), followed by deep sleep. "Generalized" seizures begin throughout the whole brain simultaneously. Secondary generalized tonic-clonic seizures start in one brain region, or focus, and spread to the whole brain.

There are other types of generalized seizures. *Absence seizures,* previously termed petit mal, cause 5 to 20 seconds of nondistractible staring, often occurring multiple times daily in children. *Tonic seizures* cause whole body stiffening. *Clonic seizures* cause whole body jerking. *Myoclonic seizures* are brief lightning-like jerks. *Infantile spasms* are brief contractions of the infant's trunk, typically in clusters and accompanied by developmental delay.

Approximately 10% of people will have a seizure. Less than 3% will have epilepsy; 7% will have only a single seizure, often provoked by a transient cause such as alcohol withdrawal, trauma, drugs, or a medical illness.

Any brain disease that affects the cerebral cortex can cause seizures and therefore cause epilepsy. However, "epilepsy" is often reserved for illnesses in which seizures are the primary manifestation. The most characteristic epilepsy syndromes cause generalized seizures from abnormalities of neural transmission without structural brain abnormalities. A few are inherited in a traditional manner but most are sporadic.

Epilepsy with visible structural brain abnormalities can be acquired, for example, from perinatal asphyxia, brain infections, or tumors, or following trauma or stroke. Developmental brain malformations are a congenital cause. The cause of epilepsy is unknown in 50% of patients.

Epilepsy is diagnosed based on the presentation of seizures, but some tests support it. An *electroencephalogram* (*EEG*) demonstrates spikes in brainwave activity in about 40% of patients. Brain *magnetic resonance imaging* (*MRI*) and *computed tomography* (*CT*) visualize a structural abnormality in a minority.

Antiepileptic drugs (*AED*) are the mainstay of therapy. Effectiveness depends on the seizure type, cause, and epilepsy syndrome. The first AED tried is effective in preventing recurrence of seizures in about 50% of patients. Another 20% will respond to the second or third AED. Approximately 30% remain refractory to AEDs. When seizures arise from a single brain region, surgery to remove the seizure focus is considered. *Temporal lobectomy* is the most common epilepsy surgery, rendering 70% of patients essentially seizure-free. Transient or mild complications occur in about 15%. Vagus nerve stimulation and the ketogenic diet are also treatments.

The previous social stigma of epilepsy being associated with mental retardation or mental illness is dispelled, as most patients are mentally normal. Most state laws prohibit driving for 6 to 12 months after a seizure, which interferes with transportation to work and social interactions, resulting in underemployment, undereducation, and social isolation.

—Nathan B. Fountain

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EQUILIBRATION

Equilibration—the process of finding equilibrium or balance—is Piaget's explanation for how learning grows. Individuals try to balance their present understandings with new events or data they encounter that conflict with what they know, while attempting to maintain stability. When individuals encounter something foreign to their learning structures, the imbalance created is restored through equilibration.

Piaget viewed equilibration as a biological, self-regulatory mechanism for all living things that helps organisms adapt to the external environment by changing internally through learning, rather than by mutation. His theory is largely applied to children's cognitive growth.

There are four factors in cognitive growth: maturation of the nervous system, social interactions, interactions with the physical environment, and equilibration. Piaget viewed equilibration as the major force tying these together. As children mature biologically and interact with people and objects, they must respond to even simple environmental stimuli, acting on these mentally and physically to understand their encounters in the world. Each encounter involves a constant balancing and rebalancing, resulting in what Piaget called "an ever-widening spiral of knowing."

Adaptation and *organization* are dual psychological mechanisms that lead to learning and cognitive growth. *Adaptation* is the adjustment to the environment, the outside-in aspect. When new events, objects, actions, or ideas are encountered that do not fit existing learning structures, the individual has to *assimilate* the new elements (a taking-in aspect) and modify those organizational structures to *accommodate*

the new information. For example, when a 2-year-old who has only experienced vanilla ice cream is given chocolate and strawberry, he has to assimilate (take in) the different flavors and colors and accommodate (modify) the knowing structure that ice cream is not just white, but varies.

Organization is the interrelated internal mental structures, the inside-out aspect. These organizations of rules and principles are also called logical structures, in which elements are continually rearranged and combined to form a strongly interconnected cognitive system allowing for ever more complex thinking. For example, the first time a child uses a computer, a very simple scheme is constructed consisting of rudimentary rules—touching keys makes marks on the screen. After time and practice, the child's computing structure accommodates word processing, e-mail, Web searches, and so forth. Development of computing principles becomes more complete and may continue to grow. Logical structures allow anticipation and planning for possibilities, leading to ever-higher levels of adaptation. With these structures, computer use becomes a tool for further learning.

TYPES OF EQUILIBRATION

Type 1—Simple Equilibration

Equilibration of object to scheme: for example, balls to a scheme of throwing. Schemes are mental structures, patterns of thought and action that allow the assimilation of new elements, helping to adapt to the environment. Although Piaget considered schemes to be focused on action (e.g., grasping, eating, drawing), concepts, theories, or ideas can also be thought of as schemes if they have assimilatory power.

Type 2—Reciprocal Equilibration

Equilibration between schemes that build subsystems, rules applicable to several schemes. When a 6-year-old cuts a snowflake from folded paper and "invents" using it as a stencil, two schemes are coordinated—cutting and coloring. The constructed principle, an insight about multiple uses, could be applied with the question, "What else can I do with it?"

Type 3—Equilibrations of Totalities

Hierarchical equilibrations in which the totality is differentiated into parts and then the parts are integrated back into the whole. Principles that apply to multiple experiences are constructed. Piaget considered this type "The secret of development and of the transition from one stage to the next." For example, the child moves to the concrete operational stage of reasoning by constructing the rules for conservation of *identity* (when a ball of clay is transformed into a pancake, if nothing is removed or added, it is the same amount of clay), *reciprocity* (a change in one aspect is compensated by change in another aspect: the pancake is wider *and* flatter), and *reversibility* (the pancake can be returned to the original form).

Equilibration of totalities may occur other than just in stage advances, particularly if applied to adult thought. Expertise may exist in a given area with very advanced, principled structures, highly integrated and differentiated in that domain. There may also be new or far less developed areas of knowing. Thus the individual can function on different learning levels, and there may be several semiautonomous totalities or subtotalities that have the potential to connect to each other.

Gifted and creative individuals develop their mental structures somewhat differently, as there is a constant effort at rule construction and connection among schemes. This allows able learners to be paradoxically better equilibrated because they anticipate possibilities and less equilibrated because there are so many conflicts to present ways of thinking.

RELATIONSHIP BETWEEN EQUILIBRATION AND STAGE GROWTH

Adaptation through assimilation and accommodation and organization through the evolution of more advanced structures or stages are how equilibration and stage growth are related. This relationship can be expressed by the formula in Figure 1 (Cohen & Kim, 1999).

The relationship between adaptation and organization is complementary (dotted lines). Although they occur simultaneously, the focus can be on one or the other, but not both at the same time. This relationship is also reciprocal (two-way arrows), connected by the inseparable processes of assimilation and accommodation. As the individual's mental structures become increasingly organized and principled, the ability to adapt successfully increases.

Existing knowing structures are both conserved and enriched as new experiences are encountered and integrated. The stage of development and the level of intelligence influence the achievement of equilibrium, which is always temporary. The seeds of the new

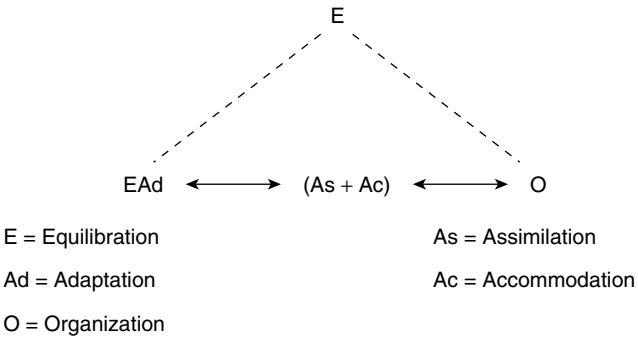

Figure 1 Cohen's Equilibration Formula

SOURCE: Cohen & Kim (1999).

disequilibrium occur in every equilibration, as there are always new questions or conflicts.

Conflict

Perturbations, gaps, contradictions, or conflicts to present knowing structures are the stimuli for cognitive advancement and *the dynamic engine* of equilibration. When in a state of disequilibrium, individuals attempt to return to a state of balance by compensating for the imbalance through the constructive process of equilibration. The puzzlement or problem must be real to the individual. It must be moderately novel, not too foreign to the learning structures, nor too familiar, for learning to occur. In other words, the individual must have already constructed preliminary mental structures that can deal with the new aspect. If an element is too foreign, it will be ignored. If it is already familiar, no learning will take place. Ignoring is one way of compensating.

Compensations

Internal structures are accommodated to moderate novelties by means of *compensations*, actions aimed at canceling or neutralizing disturbances. Compensation is an act that restores the balance in response to a knowledge disturbance. Every equilibration involves both construction and compensation. The compensations needed to accommodate schemes require the balancing of *negations* (constructing what is not visible or present—what the object or idea is not) with the *affirmations* (what is visible, present, evident) in the object. The baby must learn what is blue (affirmations) by grasping what is *not* blue (negations). To do this requires reversibility of thought, the ability to mentally undo an action. Young children do not construct negations very successfully. Their equilibrations tend to be unstable as they focus more on the positive characteristics. If there is no disturbance or conflict because the assimilation is habitual and requires no compensation, no growth occurs. The levels of compensations are as follows:

Alpha—The individual does not deal with the inconsistency and distorts, denies, or ignores it. No instruction can occur at this level until the needed underlying structures and concepts are constructed in order to be aware of the inconsistency or contradiction. *Example*: The year-old baby ignores most of the zoo animals for lack of experience with animals.

Beta—The individual attempts to deal with the inconsistency but can only deal with partial modifications (partial accommodation). The novel element is distorted to fit present schemes. Equilibrium is unstable, an optimal level for learning. *Example*: The same baby notices the tiger and calls it "keecat," distorting the object to fit a familiar cat scheme.

Gamma—If the item is not inconsistent to internal schemes, mental reorganization already occurred and the disturbance is integrated easily. *Example*: Two years later, the child easily recognizes most zoo animals and can quickly grasp animal categories when told the gorilla is not a monkey.

REFLECTIVE ABSTRACTION

Reflective abstraction is the constructive aspect of equilibration. It is the linking and feedback mechanism that moves the individual from one level to the next. It occurs when the individual constructs rules or principles from actions or thoughts, leading to new organization and greater capacity. These relationships are not inherent in the objects or ideas themselves, but must be constructed. For Piaget, reflective abstraction is composed of two inseparable aspects: a reflecting or projecting to a higher level what is known on a lower level (thinking about 2 + 6 + 9 or 9 + 6 + 2 and the resultant sum) and a reorganization or reconstruction of what has been projected (a conscious rule construction—the order in addition does not matter; the commutative property). When the individual is next confronted by a new but related problem, application of the rule can put the conflicts into a logical relationship.

In sum, equilibration is an open and dynamic balancing between the external adaptive requirements and the internal organization that changes in response to conflicts these engender. It explains the small steps in learning, as in simple equilibrations of object to scheme

or reciprocal equilibration of subsystems. It explains the transitions between stages, when the totality is reorganized and differentiated with new rules or principles. It also provides an overall direction for the development of cognitive structures. Broadly, equilibration is a biological tool by which all organisms adapt to the world and change themselves to do so. Piaget's most powerful contribution and the backbone that holds together all of his work, this concept was evidenced even in his earliest writings. The concept of equilibration can be applied to internal systems of affect and even to social, political, or business systems, which must change internally through learning in order to adapt to the world.

—LeoNora M. Cohen

See also Cognitive Development

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ERECTILE DYSFUNCTION

Erectile dysfunction (ED), sometimes referred to by its old name, impotence, refers to a condition where a man has difficulty obtaining and/or maintaining an erection sufficient for sexual intercourse. It can range from occasional difficulty keeping a firm erection to the total inability to obtain any erection at all. The best estimates suggest that between 15 million and 30 million men in the United States currently suffer from ED.

In order for a man to have an erection, he must possess well-functioning neurologic, vascular, and hormonal systems. Running the length of the penis are two chambers, called the *corpora cavernosas*. When a man becomes sexually excited due to physical or psychological stimulation, impulses from the brain and local nerves signal muscles in the corpora cavernosa to relax, thereby allowing extra blood into these chambers. As a result, the penis becomes more rigid, allowing for vaginal penetration. This process also requires appropriate levels of certain hormones, particularly testosterone. Any medical condition (e.g., diabetes, prostate surgery) or drug (antidepressants, antihypertensives) that interferes with the hormones, nerve conduction, or blood flow necessary for an erection can result in ED.

The prevalence of ED increases with age, from less than 20% at age 40 to approximately 35% (or more) at age 65. This increase is largely the result of the greater frequency of age-associated medical conditions that can impact sexual functioning, as well as the larger number of medications taken by older men that can interfere with erections. Yet getting older does not necessarily lead to the development of ED. Many men are sexually potent well into their 70s and even beyond.

In addition to medical causes for ED, psychological factors can also interfere with sexual functioning. For example, when a man is depressed or anxious, the body's ability to direct bloodflow to the penis can be compromised.

Fortunately, there are several effective treatments for ED. The most popular are the oral medications (Viagra, Cialis, Levitra) that cause the smooth muscles of the penis to relax, enabling blood to flow into the penis. These drugs, while highly effective, do not work for everyone. Other medical treatments include penile injections of vasodilators, urethral suppositories, vacuum devices, and penile implants. While effective, all of these medical treatments have side effects (sometimes quite serious ones) associated with them. When ED is primarily the result of psychological factors (e.g., stress), psychotherapy alone may be sufficient to remedy the problem.

—Donald S. Strassberg

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WebMD, Inc., http://webmd.com (search Impotence; Erectile Dysfunction)

ERIKSON, ERIK (1902–1994)

Erik Erikson was born near Frankfurt, Germany, and went on to make several important contributions to the field of life span development. After graduating from high school, Erikson traveled around Europe and studied art in Germany. At the age of 25, he was invited to Vienna to teach children whose parents were studying with Sigmund Freud. There he was trained in the psychoanalytic tradition under prominent psychoanalysts including Anna Freud. After failure to obtain Danish citizenship, Erikson emigrated to the United States in 1933 because of Fascism. Despite having no formal education beyond high school, Erikson taught at several preeminent institutions, including Harvard, Yale, and Berkeley.

Although trained as an orthodox psychoanalyst, he extended psychoanalytic theory in several significant and important ways. In contrast to Freud, Erikson conceptualized personality as a life span phenomenon in which personality develops from infancy through old age. Erikson divided the development of personality into eight separate stages across the life span, with each stage characterized by its own crisis and two possible outcomes: (1) trust vs. mistrust, (2) autonomy vs. shame and doubt, (3) initiative vs. guilt, (4) industry vs. inferiority, (5) identity vs. role confusion, (6) intimacy vs. isolation, (7) generativity vs. stagnation, and (8) integrity vs. despair. Erikson paid particular attention to the role that identity played in the adolescent period and beyond.

Erikson referred to the eight crises enumerated above as psychosocial stages of development, emphasizing the important role that social and cultural factors play in personality development (this contrasted with Freud's emphasis on psychosexual factors). According to Erikson, conflicts in each stage arise because societal and maturational factors engender new demands on individuals, and each conflict or crisis must be resolved before individuals are prepared to proceed to the subsequent stage. Based on his work with the Sioux and Yurok Indians, as well as other groups, Erikson believed that the sequence of psychosocial stages was invariant across cultures, but the means by which individuals from various cultures met each of the conflicts varied. Furthermore, he highlighted macro-level factors that affected development including the unique time and historical factors of the larger society.

In sum, Erikson was a synthetic thinker who made several contributions to the study of life span development. Despite the fact that many of his ideas have been difficult to test empirically, Erikson's life span approach and his work in adolescent development have made a lasting impact.

—Matthew J. Hertenstein

See also Psychosocial Development

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ESTROGEN

Estrogen is a generic term for a class of steroid hormones that includes 17β-estradiol, estrone, and estriol. Estrogens are synthesized from the hormone testosterone by the enzyme aromatase. Although both men and women produce estrogens, women have more of the aromatase enzyme, so they produce much more estrogens than men. Estrogens are produced in the ovaries, testes, placenta, and the adrenal cortex. In men, estrogens synthesized from testosterone promote mating behavior and bone development.

In women, estrogens are produced in the ovaries in response to hormones released by the brain (luteinizing hormone and follicle-stimulating hormone). Estrogens and progestins (a related class of steroid hormones) are released by the ovaries of postpubertal and premenopausal women in a cyclic fashion. During the menstrual cycle, estrogens promote the maturation of an egg-containing follicle in the ovary, stimulate ovulation, and produce an environment in the female genitalia suitable for fertilization, implantation, and nourishment of an embryo. Estrogens are also involved in the development of female secondary sexual characteristics, female sexual behavior, and maternal behavior. Further, estrogens promote water retention, lipid and calcium metabolism, and bone growth. High levels of estrogens in women have been linked to improved memory function, particularly verbal memory function. Exogenous estrogens are used in oral contraceptives and in treatments for female hypogonadism, primary

ovarian failure, and menopausal symptoms (see below). Because estrogens promote the growth of breast and uterine tissue, antiestrogen drugs such as tamoxifen or raloxifene are used to prevent and treat breast and uterine cancer. These drugs are termed "selective estrogen receptor modulators" (or SERMS) because they prevent the actions of estrogens in certain tissues (e.g., breast, uterus) while promoting estrogenic effects (e.g., on bone and lipid metabolism) elsewhere in the body.

Estrogens are also critically involved in early development. In female animals, an excess of estrogen just after birth can lead to male-like mating behaviors and cognitive function in adulthood. In women, the disorder, termed Turner syndrome, illustrates the importance of estrogens in normal development. Turner syndrome results from the congenital lack of the second X chromosome, which leads to an incomplete formation of the ovaries, a failure to produce estrogens and progestins, and infertility. Without estrogen therapy, girls with Turner's syndrome fail to undergo puberty. A short stature, hearing loss, kidney dysfunction, and webbing of the neck are often observed in these patients. Turner syndrome patients are also deficient in visuospatial and verbal memory, deficits that can be reduced by long-term estrogen treatment.

As women age, levels of estrogens and progestins decline significantly, eventually leading to menopause (typically around age 50). Menopause is associated with a cessation of ovulation and menstrual cycling and a significant drop in estrogen and progestin levels, which results in symptoms such as hot flashes, mood swings, decreased sex drive, and vaginal dryness. Menopause is also associated with memory loss and increased risk of Alzheimer's disease. Until recently, the hormone replacement therapy (either estrogens alone or estrogens plus progestins) prescribed to menopausal women was thought to prevent heart disease, osteoporosis, colon cancer, and memory loss. However, recent data from the large multicenter Women's Health Initiative clinical trial indicate that 5 years of estrogen plus progestin replacement produces a small but significant increase in the incidence of heart disease, stroke, breast cancer, and memory loss (although it reduced the incidence of osteoporosis and colon cancer), and estrogen replacement alone increases the risk of stroke. These data have led to the recommendation that hormone replacement be used to relieve menopausal symptoms only for short durations and in low doses.

—Karyn M. Frick

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ETHICAL STANDARDS OF RESEARCH

The study of behavioral development involves the use of both human research subjects of all ages and animals from chicken embryos to monkeys and apes. Research strategies exist on a continuum that ranges from nonobtrusive naturalistic observation to the direct experimental manipulation of the subject's internal or external environment. As the range moves from observation to experiment, the potential of lasting impact or risk of harm to the research subjects increases. Throughout the history of experimental science, in the 20th and 21st centuries in particular, researchers, philosophers, and ethicists have reflected on this fact and have offered ethical guidance in the form of principles to be considered during the planning and execution of research. Some principles are general in their concern, while others are more specifically focused on the treatment of either human or animal subjects. In addition, the principles themselves vary in terms of the specificity of their content. Some are quite broad (e.g., respect persons), while others are directly limited in scope (e.g., reduce the degree of risk).

GENERAL ETHICAL CONSIDERATIONS

1. *Research is the Province of Professionals*. A "profession" obligates its members in ways that go beyond that which is required by other important jobs. For example, members of research professions (a) must

have acquired the specialized knowledge and skills that are required to carry out research activities; (b) must agree to be governed by the relevant codes of ethical conduct (see the American Psychological Association, Society for Research in Child Development for specific standards); (c) are required to police other members of the profession for compliance to applicable ethical codes, laws, and regulations; and (d) have special obligations to protect and improve the "public good."

2. *Regulation*. Researchers are fully familiar with the relevant law and codes of federal regulation that govern the conduct of research.

3. *Justification*. There is no inherent "right" to conduct research. Research that impacts sentient beings is undertaken to advance the body of important knowledge and the well-being of humans and not to satisfy the personal curiosity of the researcher.

4. *Pre-review*. Researchers seek out review of their research by knowledgeable members of the research community and the general public *prior* to the actual conduct of the research. This process helps to ensure that the research has proper justification, is adequately designed, and contains the proper protections for the designated research participants. Federal law requires that human research be reviewed and approved by the Institutional Review Board (IRB) and animal research by the Institutional Animal Care and Use Committee (IACUC).

5. *Communication*. Researchers work to accurately communicate the results and implications of their work.

6. *Conflicts of Interest*. Researchers who have significant financial conflicts that might influence or bias the conduct or interpretation of their research disclose these conflicts and work to eliminate their impact.

7. *Education*. Researchers ensure that co-workers and students involved in the conduct of research are properly trained and supervised.

ETHICAL PRINCIPLES AND ANIMAL RESEARCH

The ethical issues that surround the use of animals in behavioral research have a contentious history. The controversy involves two fundamental issues: whether animal research is necessary to understanding human behavior and if animals have what is called "moral standing." Moral standing refers to whether or not, or to what degree, an entity "deserves" protection by the moral and ethical norms of a society. Some philosophers have argued that animals have "rights" of absolute noninterference by virtue of their rudimentary sense of self. Others have taken the position that if an animal is capable of feeling pain, this capability must be taken into ethical account when considering whether it is acceptable to use it as sources of scientific knowledge. The current consensus is that since some animal research has contributed to the understanding of human behavior, it must continue until valid alternatives are found. However, since typical experimental animals clearly are capable of experiencing pain and distress, they do require some level of ethical protection. In addition to the general ethical considerations described earlier, research with animals should also be guided by the following principles. The heart of these principles is derived from an important book published in 1959 by William Russell and Rex Burch, *The Principles of Humane Experimental Technique*.

1. *Alternatives*. Researchers strive to replace animals with alternative experimental methods whenever possible. If animals are to be used in research, they must be animals whose behavioral and psychological characteristics are relevant to the purpose of the study. Using animals just as a matter of convenience is ethically inappropriate.

2. *Pain*. The impact of pain and distress on animals must be estimated for each experiment and minimized to the greatest extent possible. Causing unrelieved pain or distress for experimental purposes requires special justification.

3. *Numbers*. If the use of animals is justified, only the minimum number of animals necessary to execute a valid experiment should be used.

4. *Husbandry*. Animals have evolved preferences for types of food, patterns of eating, social relationships, environmental quality, etc. that ought to be accommodated to the extent possible both for the comfort of the animals and the quality of the science.

ETHICAL PRINCIPLES AND HUMAN RESEARCH

The evolution of the ethical principles of human research is unfortunately a history grounded in examples of the exploitation of vulnerable populations and failure to ensure that subjects were properly informed about the nature of the research and the risks associated with participation. The Nuremberg Code (1947) was published following the war trials of a group of Nazi researchers.

The code emphasized that researchers be adequately trained, risks to participants be minimized, and decisions to participate be voluntary and based on adequate information. In the United States, the revelation in 1972 that a group of impoverished Black men suffering from syphilis had, unbeknownst to them, been part of a study of the long-term effects of untreated syphilis was a reminder that problems in research conduct were not just a matter of authoritarian governments and the environment of war. As a consequence, the National Research Act was passed in 1974, which called for the formation of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The commission was charged with deriving the ethical foundation of human research in the United States. In 1979, the Belmont Report was published. The report states that human research supported by the federal government is guided by three principles:

1. *Respect for Persons*. This principle emphasizes that showing respect requires that researchers recognize that potential participants are autonomous agents who must be fully informed about the details of the research so that they may validly apply their values to the decision to participate. This responsibility holds regardless of the perceived importance or urgency of the research. Again, there is no "right" to perform research, only rights of subjects to accept or decline to participate. This principle also requires that subjects whose ability to understand and decide may be underdeveloped or impaired (e.g., young children, demented elderly) must be protected from exploitation. When children or incompetent adults are involved as research subjects, their representatives must assume the burden of protection. This principle has led to the specific formulations of the process of obtaining informed consent. The process of informed consent involves:

   a. Disclosure of the purpose of the research and the details of the procedures to which subjects will be exposed.
   b. Ensuring that potential research subjects are competent and understand the disclosed information.
   c. Ensuring that the recruitment environment supports voluntary decisions to participate or not.

2. *Beneficence*. This principle highlights the responsibility to conduct research for a purpose that advances the welfare of people, both with respect to a specific project and to the research enterprise in general. This is accomplished by carefully estimating the risks and benefits and minimizing the risks to the greatest extent possible. This principle has been formalized as the requirement to create and examine the risk/benefit ratio before initiating a research project.

3. *Justice*. Historically, the poor and underprivileged have shouldered the majority of the risks while accruing few of the benefits of research. Justice is the responsibility to ensure that the burdens of research as well as the benefits are distributed fairly throughout society. Specifically, this principle is reflected in the way subjects are recruited.

—John P. Gluck and Charlene D. McIver

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ETHNIC CLEANSING

Ethnic cleansing has two central elements. It is a cultural and political project to construct particular groups of people as dirt and other groups of people as legitimate citizens. It is a military project to remove (or cleanse) the "dirt" in order to allow the "legitimate" citizens to live in an "unpolluted" territory.

People are defined as dirt through campaigns of racist hatred against them that portray them as eternally dangerous to the legitimate community. This racism asserts that they need to be removed not because of what they have done or what they may do but because of who they are. In order to expel whole populations,

it is necessary to create a state of terror. This is achieved by organized mass campaigns of murder, rape, torture, and theft. In order to have a hope of escaping alive, people will leave with what they can carry. Grandparents, the sick, families, men, women, and children—all will leave the place where they live and begin their new lives as stateless, rightless, propertyless seekers of asylum. Logically it is possible to imagine a peaceful ethnic cleansing, but in reality, ethnic cleansing is always achieved through terror.

Ethnic cleansing is a term that was first used during the wars in the former Yugoslavia in the 1990s. The leaderships of Croatia and Serbia aimed to carve out nation states whose citizens would identify with each other on the basis of shared ethnicity. The difficulty, however, was that people with Croat, Serb, and Bosnian identities also lived in interlinking and overlapping territories. The nationalist leaderships aimed to take territory by military force and then to expel those people with the "wrong" ethnicity. Bosnia, a territory with a Muslim majority and with large Croat and Serb minorities, was stuck in between Croatia and Serbia. The Croat and Serb nationalists in Bosnia were successful in taking leadership of "their" communities and, with the help of the respective mother countries, expelled more than 2 million Bosniaks from their homes and killed many tens of thousands. The Serb army and militias also ethnically cleansed much territory of Croats, and Croatia conducted a huge campaign of ethnic cleansing against Serbs, notably in the Krajina region.

Omarska, Kereterm, and Trnopolje were three of the concentration camps set up by Serb forces as part of the campaign of terror against Muslims in Bosnia. Many thousands of people were killed at these camps, and torture, humiliation, mutilation, sexual abuse, and rape were routine. There was also a network of dedicated rape camps where many thousands of Bosnian women were repeatedly abused. In July 1995, between 7,000 and 8,000 Muslim men were separated from the women and children in the town of Srebrenica and executed by Serb forces.

In Bosnia, and most strikingly in Srebrenica, ethnic cleansing was carried out under the noses of United Nations peacekeeping forces. As reports, pictures, and news footage of the terror in Bosnia went around the world, there was an increasing feeling that something must be done to help. There was also a self-interested fear among European governments that refugees expelled from the former Yugoslavia may appear on the frontiers of the European Union looking for asylum. There were many half-hearted interventions into Yugoslavia by the "international community" that appeared to be offering protection to the Bosniaks. These interventions failed, however, because they refused to use force to prevent ethnic cleansing. By 1999, when the Serb regime turned its attention to Kosovo, there was a different response. Although the United Nations Security Council refused to authorize help because Russia would have used its veto, NATO did act. It did not risk its troops in an operation to prevent ethnic cleansing, but it did carry out a campaign of aerial bombing of Serbia and Serbian forces until the Serbian leadership agreed to allow refugees back into Kosovo under the protection of NATO troops.

Ethnic cleansing will increasingly raise questions of the possibility, advisability, and legality of interventions from outside that aim to defend those at risk. A central question to be addressed by policy makers is how the international community can ensure that states or militias are prevented from carrying out ethnic cleansing in the future. Those who argue for military humanitarian intervention to prevent ethnic cleansing are opposed by those who argue that the principle of state sovereignty is absolute. Others oppose it on the grounds that powerful states are likely to use humanitarian intervention as a cover for imperialist adventures.

Ethnic cleansing may be prosecuted as genocide or as crimes against humanity. Following the Nazi genocide of the Jews in Europe (1941–1945), perpetrators were prosecuted for crimes against humanity at Nuremberg. International humanitarian law established the principle that such crimes were so horrific that they became the business of humanity as a whole rather than of particular sovereign states. It insisted that individuals guilty of taking part in such crimes could not plead that they were obeying orders nor could they argue that their actions were legal under national law. Now they would be held legally accountable for their actions by any state or in an international court. The Genocide Convention (1948) strengthened these principles.

In 1993, the United Nations Security Council set up the International Criminal Tribunal for the former Yugoslavia (ICTY), which grew into an institution capable of prosecuting individuals for their parts in carrying out ethnic cleansing, including Slobodan Milosevic himself, the President of Serbia and the architect of the crime. A tribunal for Rwanda was set up the following year, and currently a permanent International Criminal Court (ICC) is struggling to come into existence. The current regime in the United States opposes the ICC because it fears that American soldiers may be at risk of prosecution for war crimes

and it argues that the United States constitution is more important than international law. Supporters of the ICC argue that if the constitution of the United States is upheld, then there can be no question of Americans committing war crimes.

Although the legal definition of genocide is broad enough to include ethnic cleansing, there is another sense in which ethnic cleansing and genocide may be thought of as distinct. While both involve the racist construction of the victims as unwanted and both involve mass killing and terror, the intent of ethnic cleansing is to remove the people defined as unwanted from a particular territory. The intent of genocide may be understood as a project to kill all of the unwanted people.

Ethnic cleansing is neither new nor unusual. Settler colonial states such as Australia and the United States were established through organized racist and murderous campaigns by settlers against the people who were already living in the territories. The Soviet Union as well as Nazi Germany specialized in using mass campaigns of terror to move or eradicate whole populations. "Ethnic" Germans were cleansed from Czechoslovakia following World War II. More recently there have been Russian campaigns of ethnic cleansing against Chechens, Chinese campaigns against Tibetans, and Hindu campaigns in Gujarat, India, against Muslims. Currently (2004), it is being reported that a million ethnic Africans are being burnt out of their homes in Sudan.

Benny Morris, the Israeli historian, has offered an academic justification for certain acts of ethnic cleansing. He details Israeli acts of ethnic cleansing in 1948 against Palestinians. His argument is that without the expulsion of 700,000 Palestinians it would have been impossible for the Israeli state to come into being and that the Israeli state was necessary to defend Jews from a future genocidal campaign against them. Ethnic cleansing is always presented as self-defense; defense against those who it is claimed pose the real and enduring threat.

Yet Israel is far from unique in this respect. Most nation states were established through an act or a series of acts of ethnic cleansing. Benedict Anderson understood the nation as an imagined community. Contrary to the rhetoric of all nationalists, who insist that nations are natural and timeless communities, he argues that nations are socially constructed through the shared imagining of such communal ties. This is why the first element of ethnic cleansing, the construction of the victims as not belonging, is as central to its understanding as the terror and the expulsions. Before the terror comes the imposition of identity. Before the 1990s, most Muslims in Bosnia, and also in Chechnya, did not identify their Muslimness as the overriding and defining element of their identities. After they had been defined as Turks, invaders, fundamentalists, and terrorists by the Serbs or the Russians, after they had looked in vain to Europe and America for human rights, and after the Islamic fundamentalists arrived in Sarajevo and in Grozny offering guns, bread, and easy explanations, some people began to think of their identities differently.

Should we use the term ethnic cleansing if we do not agree that the process involves any kind of genuine cleansing? It is a term invented by the perpetrators straightforwardly to describe their project. The term is attractive because of its shocking simplicity. Contained within it is simultaneously an admission of guilt by those who use it and a defiant defense of the indefensible. It is a term that describes very clearly what it means to describe, yet perhaps we can subvert it, somehow, by using it ourselves.

—David Hirsh

See also Ethnic Identity

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ETHNIC IDENTITY

In our increasingly diverse society, issues of race and ethnicity have become of utmost interest to psychologists. *Ethnic identity* refers to a person's social

identity within a larger context based on membership in a cultural or social group. Research about ethnic identity has come from various disciplines, including psychology, sociology, and anthropology and thus has been conceptualized and measured in different ways depending on the discipline. While sociologists and anthropologists have investigated group level processes related to ethnic identity, psychologists have focused more on the individual and the development of ethnic identity on the individual level.

Current conceptualizations of ethnic identity within psychological research suggest that it is a complex, multidimensional construct, with members of ethnic groups potentially varying widely in their sense of ethnic identity. Within an individual's lifetime, as he or she encounters different situations and other people, ethnic identity can change and become more or less salient for that person depending on the context. Furthermore, societal and political influences (e.g., the Civil Rights era, and increasing immigration to the United States) can play a role in the development of ethnic identity, again emphasizing the dynamic and fluid nature of this construct.

While researchers disagree on the different aspects that comprise ethnic identity, common elements have been identified across ethnic groups. First, ethnic identity includes *ethnic self-identification*, or an individual's self-label as a member of an ethnic group. Feelings of belongingness and evaluations of one's ethnic group, as well as preferences for ethnic behaviors and practices, represent *the affective components* of ethnic identity. *Cognitive components* of ethnic identity refer to an individual's knowledge about his or her ethnic group, such as cultural traditions and history. Finally, *value orientations*, which refer to cultural values associated with a group's ethnicity (such as collectivism and familism), are another important aspect of ethnic identity.

Research about ethnic identity has involved interviews, open-ended questions, and quantitative measures and questionnaires. Findings suggest that members of ethnic groups report ethnic identity to be a defining aspect of their identity. Results also suggest that for some individuals within different ethnic groups (i.e., African Americans, Asian Americans, and Latinos) ethnic identity is associated with self-esteem, though this relationship depends on the individual and ethnic group. Specifically, individuals with more positive evaluations of their ethnic group tend to have higher levels of self-esteem. This relationship is usually stronger for individuals for whom ethnicity is salient, such as members of minority groups within the United States.

Various theories have been proposed to describe the process that individuals undergo as they form their ethnic identity. One of the earliest models of racial/ethnic identity was advanced by William Cross (1971) to describe African American identity development, and this model has since been applied to other ethnic groups as well. In this conceptualization, racial identity development involves a process of four stages: pre-encounter, encounter, immersion-emersion, and internalization. During each of these stages, an individual negotiates the culture around him or her, moving from a goal of assimilating to European American culture to the final stage of possessing a secure African American identity. Janet Helms (1990) has described a model of White racial identity that is analogous to the model proposed by Cross, though it involves six stages of identity development. Finally, Jean Phinney's (1991) model of ethnic identity is based in Erikson and Marica's psychosocial approach to development. This stage model, which has been studied within adolescents, suggests that as an individual moves from an unexamined identity to searching for an identity to identity achievement, self-concept will increase. Thus exploring the meaning of one's ethnicity often leads to a secure ethnic identity in an adolescent or young adult.

—Lisa M. Edwards

See also Ethnic Cleansing

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ETHOLOGY

Ethology is a branch of biology that focuses on animal behavior. It originated in European zoology in

the 1930s and revolved around the study of instinctive and fixed-action patterns of behavior. Ethologists study the animal's behavior in its natural environment rather than in a laboratory. Ethology paved the way for comparative psychology. Specifically, ethologists and comparative psychologists use similar methods to study the behavior of animals, human or nonhuman. The main distinction between the two sciences is that ethology is a biological science and attempts to reduce behavior to biological and physiological characteristics whereas comparative psychology is the study of the role of learning as an explanation of behavior.

Karl von Frisch, Konrad Lorenz, and Niko Tinbergen are credited with developing ethology. They were awarded the Nobel Prize for Medicine in 1973. Although the early pioneers of ethology differed from the comparative psychologists in their views of behavior, by the 1960s the two sciences had gained mutual respect for each other's work. The 1970 article by Robert Hinde, "Animal Behaviour: A Synthesis of Ethology and Comparative Psychology," did much to further the cooperation.

KARL VON FRISCH

Karl von Frisch was curious about the behavior of honeybees after they had found a food source. He developed a way to look inside the hive after a forager bee arrived from ingesting food. He saw the forager bee make a straight run, circle halfway around, then cross to the opposite side in a figure eight pattern. After observing the forager, the worker bees left the hive and ended up at the food site of the "dancing" bee. Von Frisch proclaimed that the dance pattern provided encoded details of the location of the food. He believed the straight line indicated the direction of the food in relationship to the sun while the speed and duration of the dance conveyed the distance to the food.

KONRAD LORENZ

Konrad Lorenz was interested in social stimulation and motor patterns of precocial birds. Precocial birds are able to leave the nest soon after hatching. Although they are able to feed themselves, the young birds stay close to the mother. They must, therefore, become attached to the mother very soon after hatching or face the possibility of becoming separated and not surviving. Lorenz studied goslings and discovered that they would become attached to any moving object during certain times after hatching. He termed this behavior imprinting, and the short period of time in which it developed was called the critical, or sensitive, period. He demonstrated that goslings would follow a variety of stimuli as long as it moved. For instance, the goslings became attached to a large ball, a decoy duck, and to Lorenz himself. Many introductory psychology and biology textbooks contain a photograph of Lorenz being trailed by several goslings. Imprinting is found in many species of birds including ducks, geese, chickens, quail, and turkey. Lorenz repeatedly replicated the findings that imprinting occurs only during a very short time, it occurs very rapidly, and it is irreversible.

NIKO TINBERGEN

Niko Tinbergen was a colleague of Lorenz. He spent many hours in the field observing behavior before moving into the laboratory to study the cause and adaptive function of the behaviors. For instance, Tinbergen studied releaser mechanisms and sign stimuli of instinctive behavior. Unlike the comparative psychologists, Tinbergen believed that certain survival behaviors are innate, and he was interested in finding the mechanism that stimulated these behaviors. For instance, he found that the herring gull chick pecked on the orange spot on the parents' bill. The orange spot, termed the sign stimuli, was the releaser mechanism that stimulated pecking. The pecking, in return, provided the chick with food from the parent.

—Sherril M. Stone

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EUTHANASIA

The term *euthanasia* often elicits a variety of responses from individuals. The reactions may be

related to one's understanding of what euthanasia is, one's experience with end-of-life decision making, one's religious or spiritual belief system, or any number of other factors. This review will attempt to clarify some of the definitions associated with different types of euthanasia, as well as present a historical perspective of the discourse on euthanasia in order to provide a context for the more current developments in the area. Attitudes toward euthanasia found across the major racial-ethnic groups within the United States will be explored. International perspectives on euthanasia legislation will also be discussed. Finally, some of the arguments for and against legalizing euthanasia are offered.

TERMS AND DEFINITIONS

Before beginning a discussion on euthanasia, it is helpful to review some of the terms that are often associated with this area. *Euthanasia* is derived from the Greek words "eu" and "thanatos" which literally mean "good death." The term has come to mean bringing about a gentle and easy death. *Active euthanasia* entails an active intervention by a physician to end life. *Passive euthanasia* is deliberately withdrawing or withholding medical treatment that would help the person live longer (this may or may not involve the intention of hastening death). Examples of this are removing a feeding tube or withdrawing artificial life support interventions. *Voluntary euthanasia* is euthanasia that is performed at the request of the person who dies. *Involuntary euthanasia* is ending the life of an able person without her or his consent or against the person's will. *Nonvoluntary euthanasia* is ending the life of a person who is not able to give permission. The individual who carries out the euthanasia may do so for the other person's "best interests." *Physician-assisted suicide* is closely related to voluntary euthanasia, but the physician only prescribes rather than administers a lethal drug to the person.

OVERVIEW OF THE HISTORICAL DISCOURSE ABOUT EUTHANASIA

Prior to World War II, perspectives on euthanasia were significantly influenced by ancient Greek practices and discourse. Euthanasia is generally understood as a hastening of one's own death and thus was often discussed in terms of suicide. Even in ancient Greece there was some disagreement about the acceptability of euthanasia and suicide. Some argued that suicide is an offense against the state and one's family. On the other hand, there also was an ideal espousing the perfect balance between physical and mental well-being, which was used as a foundation for tolerating euthanasia. Aristotle and Plato endorsed a form of eugenics in order to ensure an optimal state with the worthiest citizens. Furthermore, in areas of ancient Greece in which the state allowed suicide, individuals who sought official permission to take their lives were supplied with poison by the local magistrate. Suicide was also an option for stoics when life was judged as not being in harmony with nature. The disharmony could be the result of illness, physical deformity, or pain. Although there was much disagreement over the acceptability of suicide and euthanasia, the ancient Greeks were perhaps the first to rationally consider the grounds for hastening death. They also suggested that in certain circumstances hastening death was indeed the most humane thing to do.

With the rise of Christianity and through the middle ages, suicide was denounced. Harsh religious and civil penalties were imposed against the body and property of the deceased. Christianity viewed that it was not an individual's privilege to decide how or when to die. That right was reserved for the will of God. With the advent of the Renaissance came the rediscovery of ancient Greek and Roman thought, as well as resurgence in scientific, empirical investigation. There was also an increased interest in facilitating a comfortable and easy death. This led to greater flexibility in thought relating to suicide, although this was primarily confined to philosophical writings.

By the 18th century, the discourse had moved away from being largely confined to the philosophical realm and flexibility in thought was observed in many segments of society. Physicians were discussing the responsibilities to their patients as far as facilitating a natural and humane death. Also, the public stigma against suicide was declining. This is evidenced by the easing of consequences levied against the family, estate, and body of an individual who died as a result of suicide. Hastening one's death was seen as more acceptable when an individual was experiencing an incurable disease or great suffering.

During the 19th century and into the early 20th century, there was increased attention to an individual's right to choose when and how to die. Further, physicians were arguing that attention needed to be given to the needs and desires of terminally ill patients who deserved to have their pain alleviated. Arguments were also made for alleviating the suffering and burden of individuals classified as "hopeless idiots," "imbeciles," and "monstrosities." These pleadings were sometimes made to legislatures in an effort to obtain

state sanction of physician-assisted hastening of death. Although these bills received a significant amount of public support, there were often as many or more opponents to them.

Up to this point, support for euthanasia existed primarily as an option for individuals who were terminally ill, as well as for individuals born mentally retarded and/or severely deformed. When legalization of euthanasia was sought, most bills had provisions for some type of a review of the request by representatives of the state, physicians, and perhaps members of the individual's family, as well as sections delineating limitations on the persons eligible to make the request. In addition to efforts to pass legislation, an increasing number of court cases relating to euthanasia or mercy killings were publicized during this period of time. The consequences for individuals who assisted in the act of euthanasia were often light, as there was mixed concern and sympathy for the individuals due to the circumstances surrounding their actions.

The word euthanasia would forever become tainted by the events that occurred in Germany prior to and during World War II. In Germany, as in other countries including the United States and Britain, the idea that a certain quality of life was not worthy of living became popular. Arguments were put forth that suggested that euthanasia was a humane way to end the suffering of individuals with physical and/or mental "handicaps," as well as alleviating the burden on their families and the state. In Germany, this policy became state sanctioned and was used as a justification for the murder of approximately 100,000 physically and/or mentally handicapped individuals. The methods used to kill these people were particularly brutal, and the actions came to light during the Nuremberg war trials. These events radically influenced the future of the discourse on euthanasia.

In the decade following World War II, there were a number of court cases in the United States involving individuals, often family members, who engaged in the "mercy killing" of someone who was terminally ill or severely disabled. There was a significant amount of public support for these individuals, and several of them were acquitted on bases such as temporary insanity. Those who were convicted of their charges were often given some measure of leniency. On the other hand, there was also significant opposition to euthanasia. Opponents often cited the slippery slope argument, stating that if euthanasia was sanctioned at any level, it could lead to the abuses experienced in Nazi Germany. They argued that those events started from a belief that there was a life that was not worth living.

The debate continues into the present with passionate arguments on both sides. There have been developments in terms of legislation allowing for living wills and Oregon's Death with Dignity Act, which is the first legislation passed in the United States legalizing physician-assisted suicide. Distinctions have been made between active and passive euthanasia, with passive euthanasia becoming more widely accepted and discussed in terms of end-of-life decision making. In addition, language has changed so that the term is rarely used in the United States because of concern that if people associated withholding or withdrawing treatment with "euthanasia" then these actions would not be requested by people or performed by medical professionals.

CULTURAL ISSUES RELATED TO EUTHANASIA AND END OF LIFE WITHIN THE UNITED STATES

Individuals from a variety of backgrounds live in the United States and bring with them their own set of cultural values and beliefs that influence end-of-life decision making. This section will briefly discuss differences in beliefs about end-of-life decisions and voluntary euthanasia among five of the major cultural groups in the United States, including European Americans, African Americans, Latinos, Asian Americans, and Native Americans. It is important to note that there is a great deal of heterogeneity within each of these groups. Cultural influences other than "race," including ethnicity, religious affiliation, the region in which one was raised, membership in other groups, and personal experiences with dying and death will also influence end-of-life decision making and views on voluntary euthanasia. When working with individuals from these cultural groups it is important to discuss these issues on an individual basis.

European Americans represent the dominant culture within the United States. Thus much of the mainstream values and discourse about euthanasia are reflective of western European values. These individuals, in general, view euthanasia more favorably than other groups. This is reflective of the values held as a group including a value for achievement and success, material comfort and consumerism, freedom, secular rationality, and autonomy. These values influence the desire for personal control in end-of-life decision making. Furthermore, the values of productivity and

achievement as well as material comfort may influence a greater acceptance of voluntary euthanasia.

As a group, African Americans are generally less likely than European Americans to approve of voluntary euthanasia. Additionally, as a group, they are also less likely to approve of discontinuing life-prolonging treatments. A history of racism is one factor that may influence the views of African Americans about end-of-life decisions. Because of past events, such as the Tuskegee Syphilis Study, many African Americans may experience a distrust of the institutional systems developed by the dominant European American culture, which may be compounded by the documented differences between the groups in terms of access to available health care. This distrust may also lead to a less favorable view of advanced directives and a concern about being allowed to prematurely die if life-sustaining care is not utilized to its maximum.

As a group, Latinos are more likely than African Americans to agree that there are situations in which voluntary euthanasia is acceptable, although the rate of agreement is generally lower than that of European Americans. There are certain cultural values that influence the preferences for end-of-life care for Latinos as a group. In particular, Latinos tend to have a more collectivistic rather than individualistic orientation than European Americans. There is less importance placed on individual decision making and more emphasis placed on the good of the family. There is also a value on focusing on the present rather than the past or the future. This value may hinder planning advanced directives. Finally, there may be a strong religious orientation that may prevent considering anything that may seem like "playing God" near the end of life.

Although there is a good deal of heterogeneity within each of the discussed groups, this is particularly true for Asian Americans. Individuals who come from regions with many different subcultures, languages, and values are lumped together under this label within the United States. This makes it especially difficult to make generalizations about this group. Furthermore, very little research has been performed investigating preferences for end-of-life care. These are limitations to the material presented regarding this group. In many Asian cultures there is a strong family orientation. Therefore, family members may be the ones making decisions about end-of-life care, rather than patient. In some Asian cultures, speaking of death is taboo, and so many Asian individuals may be reluctant to discuss advanced directives. There is also some evidence that suggests that at least some subgroups of Asians are more likely to request life-sustaining interventions and are more reluctant to withdraw life support than European Americans.

Very little data exist about end-of-life preferences of Native Americans. Much of the research that exists is in the form of case studies. In addition, there are hundreds of tribes, so the same problems with generalizations mentioned in the section on Asian Americans are present here. From the limited research available, there appear to be certain values that influence end-of-life decision making for Native Americans. One example is the value of autonomy. Although Native Americans, in general, value autonomy, there is also an emphasis on cooperation and consensus; thus an individual may yield his or her own decision to the wishes of the group. Participation of cultural healers as well as the incorporation of traditional rituals and practices may also be particularly important when facing end-of-life care. More work needs to be done in order to have a more complete understanding of Native American perspectives on end-of-life care and particularly voluntary euthanasia.

INTERNATIONAL PERSPECTIVES ON EUTHANASIA

The world's first euthanasia society was founded in London, England, in 1935. In 1976, the first international meeting of "right-to-die" groups occurred in Tokyo when representatives from six organizations gathered. Since then, the international movement has grown considerably, with the World Federation of Right-to-Die Societies being founded in 1980 with 27 groups from 18 countries; there are currently 38 member organizations representing 23 nations. Although there are efforts being made in many countries, the emphasis of this section will be on those nations where euthanasia is actually legal or being publicly practiced. The situations in Germany and Switzerland are complex regarding assistance in dying, and there is lack of clarity about the degree to which voluntary active euthanasia (VAE) versus assisted suicide is practiced; therefore, these countries will not be discussed below.

The Netherlands

The country most associated with euthanasia is the Netherlands, because for decades this was the only place in the world where euthanasia was practiced

openly by physicians, even though it was not explicitly legal. The movement began in the early 1970s when a physician, Gertruda Potsma, gave her dying mother a lethal injection and was given a light sentence. This led to the founding of the Dutch Voluntary Euthanasia Society (referred to as NVVE) which, in 1975, began aiding members in hastening their deaths.

In 1984, the Supreme Court in the Netherlands approved of VAE under certain circumstances and indicated that if a set of guidelines and procedures was met, physicians would not be prosecuted. In 1994, the Dutch parliament formalized the procedures but kept VAE as a criminal offense. The guidelines, based on recommendations from the Royal Dutch Medical Association, stated that a person could receive VAE if (a) the person makes an explicit request; (b) the decision is well-informed, free from coercion, and enduring; (c) there is no alternative acceptable to the person to alleviate suffering; (d) the attending physician exercises due care in deciding to agree to assist and consults with another physician (who must meet personally with the person); (e) a physician is the one to administer the medication; and (f) the physician reports the death to the medical examiner, who then reports to the local district attorney. Prosecutions would happen only if the guidelines were not followed.

In November 2000, the Lower House of the Dutch Parliament approved a bill allowing VAE and assisted suicide; the Upper House approved the bill in April 2001 but it was not to go into effect until April 1, 2002. The previous guidelines were kept in place with the "due care" aspect being clarified. To meet the due care requirements, the physician must (a) be convinced the decision is voluntary and well considered, (b) be convinced that the person is facing interminable and unendurable suffering, (c) have informed the person about the diagnosis and prognosis, and (d) be convinced that there is no other reasonable solution (and the person requesting VAE must also be convinced of this). Consultation must still take place. Five regional review committees, comprising, at a minimum, a legal expert, a physician, and an expert in ethics or philosophy, review the case to determine if the criteria are met; however, the public prosecutor has the authority to further investigate deaths.

One of the most controversial parts of the bill that was passed was the age of eligibility. After much discussion, it was decided that children aged 16 or 17 could receive VAE or assisted suicide if their parents are involved in the decision-making process, while those aged 12 to 15 would need parental consent.

It is estimated that approximately 3,500 deaths a year result from VAE, which corresponds to about 2.6% of all the deaths in a given year in the Netherlands.

Australia

In May 1995, the Northern Territory of Australia became the first place where a legislature passed a law allowing VAE, called the "Rights of the Terminally Ill Act." The law was amended in February 1996 and put into effect in July 1996; however, because the territory is not considered independent, the Australian Federal Parliament had the ability to vote to rescind the Act and did so in March 1997. Prior to this action by the Parliament, the Act survived two court challenges and a legislative effort to repeal it within the Northern Territory itself.

Before it was rescinded, the amended Act required the person seeking VAE to consult with four physicians—one who would help the person die, a specialist in the person's disease, a psychiatrist, and a palliative care specialist—and get the first three to sign a request form. The first person to try to use the Act, Max Bell, could not get a signature from a cancer specialist; Bob Dent, who had prostate cancer and died on September 22, 1996, was technically the first person to die under a voluntary euthanasia law. Three others, all patients of Philip Nitschke, did use the Act to hasten their deaths; two others had obtained all the signatures necessary but were unable to use the Act before Parliament acted.

Belgium

In September 2002, Belgium passed a law similar to the one in the Netherlands. The first report of implementation of the law came from the Federal Commission of Control on Euthanasia in 2004.

Colombia

In 1997, the Colombian Constitutional Court (the highest court in the country) ruled that it was not a crime to assist a terminally ill person who has given informed consent to die. However, although the Court ruled that VAE is constitutional, the country's Parliament has not yet developed legal regulations or attempted to amend the constitution to overrule the Court.

ARGUMENTS FOR AND AGAINST VOLUNTARY ACTIVE EUTHANASIA

Thus far, this entry has focused on the *facts* of euthanasia in the United States and internationally. At this point, it is necessary to outline some of the major arguments for and against VAE as an acceptable practice; as will be made clear, these are based on *opinions* and interpretations of the facts. Entire books have been written arguing either side of the debate, and thus this material is merely a brief review of the points made by proponents and opponents.

ARGUMENTS IN OPPOSITION TO VAE

Coercion. There is significant concern that people may not be making free, fully informed choices. The possibility that people may be coerced into "choosing" VAE, especially because of financial issues or the feeling that they are a burden, is a strong argument against VAE.

Religious beliefs. A large number of people believe that only a Higher Power can give life and end it. In fact, religious beliefs are the strongest predictor of opposition to VAE. A related belief is that suffering can have meaning and value to the person and his or her loved ones.

Slippery slope. Another concern is that VAE will lead to involuntary euthanasia in general as well as for a larger group of people than would have "qualified" for VAE. This may happen both as a result of losing control as well as habituation to the practice of euthanasia.

Unnecessary. This argument is that most people can have their symptoms, especially pain, controlled through the use of hospice and palliative care efforts, thus there is no need to have VAE. A related concern is that allowing VAE would reduce interest in improving palliative care.

ARGUMENTS IN SUPPORT OF VAE

Already happening. The basic idea here is that VAE is already happening, so by legalizing it and bringing it into the open it can be better regulated and problems can be minimized. The argument is supported by the fact that there already exist legal actions very similar to VAE.

Autonomy. The most commonly heard argument in support of VAE is that people have the right to decide for themselves the degree to which they want to have power over how and when they die. This is often phrased as "choice" or "self-determination" but ultimately it is about control.

Just one option of many. Related to the autonomy argument, this contention is that allowing VAE does not eliminate other options, it merely adds another to the list. Thus, a person could choose VAE or not, but at least it would be available for those who might want it legally.

Quality of life. This argument asserts that there is more involved than pain (and even it cannot be completely managed), there are other symptoms that cannot be controlled, there are personal perceptions of dignity, and the basic idea is that quality is preferred over quantity.

CONCLUSION

There are many forms of euthanasia, some of which are more practiced and more acceptable than others. Although significant attention has been given to euthanasia in a few countries, it is likely that interest in, and attention to, euthanasia will continue to grow wherever technology has advanced to the point where people perceive that they may be kept alive even though their lives have no meaning to them or they are suffering greatly. However, the fact that interest in euthanasia may be present does not mean that legalization is necessarily a good idea or that it is the best option for a given individual.

—James L. Werth, Jr., and Andrea M. Sever

See also Death

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EXECUTIVE FUNCTIONING

As we grow, our brain continues to develop through adolescence. We know that while different areas in the brain are associated with various abilities, it is with the frontal lobes, located in the newest, outer layer of the brain and which Dr. Elkhonon Goldberg, a leading expert in the field, describes as the instrument, and the agent of control within the central nervous system (CNS), that executive function is most often linked.

Executive function can be conceptualized from a variety of perspectives. Generally there is agreement that executive function includes some degree of cognitive abilities that assists us in engaging in behaviors that are directed toward achieving complex goals. In addition, adaptability to changes and demands within the environment is critical. Other definitions might include (1) the ability to anticipate and plan outcomes, (2) the ability to monitor one's own behavior for desirability or suitability in a given situation, (3) the ability to determine effectiveness of how we solve problems, and (4) the ability to allocate attention.

The frontal lobes, or prefrontal cortex, play a specialized role in orchestrating other brain areas. However, to do so, the prefrontal cortex receives input from many other cortical areas. This synergistic relationship suggests that the prefrontal cortex is dependent on other brain regions for input. To operate to the optimum, the information shared between brain regions must be of good quality.

For many decades, early neuropsychology thought that prefrontal functions did not emerge until late childhood or early adolescence. Due to the prevalence of this thinking, our understanding of the development of executive functions is more recent than our understanding of other cortical areas. A number of various methodological approaches have been used to add to our understanding of how the frontal lobes, hence executive functions, develop. Recent evidence linking CNS maturation and cognitive development provides a framework for understanding brain-behavior relationships through childhood. The frontal lobe seems to develop in growth spurts. Current research in this area suggests that the basic executive functions develop early in life and follow a stepwise progression to maturity in adulthood. Improvement in executive functions appears to be orderly coinciding with these growth spurts. Some experts place the first of these growth spurts in the frontal regions between birth and 2 years of age. A second growth spurt occurs between 6 and 7 years of age. Welsh asserts through his research that the ability to resist distraction matures at around age 6. Various researchers identify that additional growth spurts occur at about 10 to 12 years of age, followed by spurts in the later teen years.

As children grow and develop, they are better able to regulate their behavior. The ability to plan, set goals, and respond to their environment becomes the basis for behavioral choices that are mediated or regulated by the prefrontal cortex. We may think of executive function, then, as the component that directs attention, monitors and/or regulates activity, and coordinates and integrates information and activity. Goldberg recognizes that the capacity for volitional control over one's actions is not innate, but it emerges gradually through development (Goldberg, 2001).

Let us consider that the difference between the time knowledge starts versus knowledge-based action or behavior appears to be an expression of the development of prefrontal executive function. As a result of her experiments, Baillargeon and her colleagues have demonstrated that infants have knowledge of object permanence—the knowledge that an object continues to exist even though it is no longer present in the immediate environment—months before they are able to utilize that knowledge to guide goal-directed search behavior. Almost certainly the maturation of executive and other systems in the prefrontal cortex between 4 and 9 months of age is necessary for this goal-directed behavior to occur.

Maturation of executive functions is crucial to psychological adaptation and adjustment across the life span. Dealing with the inherent ambiguity is among the chief functions of the frontal lobes. As the individual develops, executive planning involves complicated, means-end problem solving to achieve a behavioral goal and the ability to delay a response. Executive processes required for success in an interactive social environment are much more complex and wrought with ambiguity than the executive processes required when individuals have only themselves to consider.

—D. Tighe Cooke

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EXERCISE

Exercise is commonly associated with aerobic activity or sustained activity over a period of time that utilizes and strengthens the cardiovascular and pulmonary systems. Aerobic exercise involves repetitive movement of large muscle groups and increased respiration rate. Anaerobic exercise, in contrast, generally involves short duration movements of smaller muscle groups and strength-training exercise, helping to increase muscle mass and build and maintain healthy bones. In the following discussion, the terms physical exercise and physical activity will be used interchangeably to refer to the effects of both aerobic and anaerobic exercise.

CURRENT RECOMMENDATIONS FOR EXERCISE

The Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) have provided exercise recommendations for all age groups. Current recommendations focus on healthy, active lifestyles rather than the previous recommendations focusing only on cardiovascular fitness. This is due to recent evidence suggesting that moderate amounts of exercise may contribute to improvements in health and that vigorous exercise is not essential for health enhancement. The CDC recommends that adults engage in at least 30 minutes of moderate intensity exercise (e.g., walking briskly, swimming, or dancing) at least 5 days a week or vigorous activity (e.g., jogging, swimming laps, or high impact aerobics) 3 days a week for 20 minutes. In addition, the CDC recommends that older adults engage in moderate intensity exercise for 30 minutes, 3 to 5 days per week, and also recommends strength training 3 days per week to help increase muscle tone and prevent falls. To further encourage people to increase their activity levels and to recognize their current level of activity, many different activities are provided by the CDC as examples of moderate activity, such as gardening, heavy cleaning, walking, and jogging. The guidelines recommend daily physical activity for adolescents, with moderate to vigorous exercise for at least 20 minutes, 3 days a week. The recommendation for children is 30 to 60 minutes of physical activity or accumulated play on all or most days of the week.

DEMOGRAPHICS

In the United States, less than 40% of adults achieve the recommended amounts of exercise and 25% of adults are not at all active. Participation in regular exercise decreases with age and is more common among men than women. One third of older adults age 65 and older are completely sedentary and engage in no regular exercise. People who exercise regularly are more likely to have higher income, more education, and are more likely to be Caucasian.

Exercise patterns are similar for adolescents and younger adults. Nearly 50% of individuals aged 12 to 21 do not engage in regular vigorous exercise. Exercise activity decreases with age from childhood through adolescence. Exercise levels are greater among young men than young women.

AGE SPECIFIC BENEFITS

Children and Young Adults

Among children, regular physical exercise has many physical, social, and psychological benefits. During the years of physical growth, regular exercise helps to build strong, healthy bones and protects against the development of osteoporosis. Regular exercise also builds more lean muscle while helping prevent obesity.

Among young adults and children, there is a relationship between engaging in regular physical activity and engaging in other healthy behaviors, such as maintaining a healthy diet. Young adults who are inactive tend to eat fewer fruits and vegetables. In addition, young adults who engage in regular exercise may be less likely to engage in risky behaviors, such as using alcohol and drugs, and may be more likely to stay in school. Research has suggested that regular

exercise may lead to an increased capacity for learning in children and adolescents, which may, in turn, improve academic performance.

Regular physical exercise also has been found to promote social interaction and psychological well-being, in particular self-esteem. Physical activity in the form of sports participation provides an opportunity for young adults and children to learn about and experience teamwork, self-discipline, leadership, and socialization.

Interventions have been developed to promote regular physical exercise among children and young adults in an effort to help build healthy habits that will last through adulthood. Factors that predict future physical activity among children and adolescents include male gender, intent to be active, a preference for activity, healthy diet, previous physical activity, access to programs or facilities, and time spent outdoors.

Adults

Regular exercise in adulthood helps to prevent chronic illness and premature death and also helps moderate the effects of stress on the body. Stress is associated with the release of hormones such as adrenaline and cortisol. In the case of an acute stressor, the release of these hormones is adaptive, mobilizing the body for action. However, if the stress is chronic in nature, the hormone response may not be adaptive and can contribute to health problems, including immune dysfunction. Stress also may increase cardiovascular reactivity, as reflected by exaggerated blood pressure and heart rate response following the onset of a stressor, and delayed recovery time following the stressor before heart rate and blood pressure return to resting levels.

Regular physical activity may be an effective tool for stress management and can help to reduce the effects of chronic stress on the body by aiding in the regulation of adrenaline and cortisol, regulating immune system functioning, and reducing cardiovascular reactivity. Regular physical exercise may increase immune activation, thus helping to prevent illnesses, both acute and chronic. Research has suggested that the release of endogenous opioids, or natural pain inhibitors, during exercise also may help to modulate immune activity. Among individuals with chronic conditions, such as hypertension or type II diabetes, regular exercise may decrease the need for medication to control the condition.

Regular physical exercise may reduce symptoms of depression or anxiety disorders in adults. Research has shown that regular physical exercise is associated with as much symptom relief as medication or combination of medication and psychological treatment. In addition, depressed individuals who maintain regular exercise show a decreased chance of relapse as compared with medication or combined treatment. Regular physical exercise can also improve self-efficacy, which may improve mood as well. Regular physical exercise in a group setting provides additional social support and may increase the likelihood that the exercise program will be maintained.

Due to the large number of benefits of exercise, many research studies have explored various intervention strategies designed to increase exercise adherence. Cognitive-behavioral strategies have been used, including contingency contracting, self-monitoring, and goal setting, but have met with only limited success. Other strategies that have been utilized include techniques to maintain behavioral change, such as reminder phone calls, and relapse prevention techniques, such as increasing awareness of obstacles and developing adaptive coping techniques. One reason that intervention strategies have had only limited success may be that they need to be individualized to promote and maintain exercise according to the respondent's stage of change.

Older Adults

Among older adults, regular exercise helps to maintain healthy bone mass and reduce the risk of fractures and the risk of falling. Exercise may also improve the ability of older adults to live and function independently and may allow older adults to maintain cognitive skills that otherwise show decline with age. Older adults who engage in regular physical activity may show better performance on measures of executive functioning, verbal fluency, and memory, for example. In addition, imaging studies show that aerobic exercise may protect against age-related brain atrophy, particularly atrophy in the prefrontal cortex.

GENERAL BENEFITS OF EXERCISE ACROSS THE LIFE SPAN

Health benefits of regular physical exercise include a decreased risk of premature mortality and a decreased risk of developing chronic medical conditions, including

type II diabetes, heart disease, high blood pressure, and colon cancer. Regular exercise helps build and maintain healthy bones, muscles, and joints. Exercise also aids older adults in increasing strength, preventing osteoporosis, and reducing risks of falling.

Another benefit of exercise across age groups is the prevention and treatment of obesity. The consequences of obesity for physical health include increased mortality and increased risk of chronic illnesses such as cardiovascular disease, type II diabetes, osteoarthritis, and asthma. Consequences of obesity for psychological health include depression and social stigmatization. Obesity rates are rising across the country in both children and adults. Nearly 61% of adults are either overweight or obese, with a body mass index (BMI, or weight in kg/(height in m)^2) greater than or equal to 30. Rates of obesity have nearly tripled for children over the past 30 years, from about 5% to about 15%. The demographic pattern of obesity and overweight is consistent with that of regular exercise, as obesity is more common among individuals with lower socioeconomic status (SES) and exercise is more common among higher SES levels. Therefore, one important benefit of regular exercise is to help promote and maintain healthy weight.

SUMMARY

Regular physical exercise is associated with various physical and psychological benefits among all age groups. Physical benefits include building and maintaining healthy bones and muscles, promoting healthy cardiovascular and pulmonary functioning, regulating body weight, and preventing chronic illness and premature mortality. Regular physical exercise is also associated with reduced feelings of depression and anxiety, improved capacity for coping with stress, and enhanced psychological well-being.

—Meghan D. M. Fondow and Charles F. Emery

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EXPERIMENT

An experiment is a scientific study designed to uncover information about cause and effect through examining the influence of changes in some variable or condition on a measured outcome. In a true experiment, changes in one or more independent variables are tested and the resulting effects on one or more dependent variables are assessed. For example, researchers interested in whether training strategies can help children's memory performance might design an experiment in which they manipulate the type of strategy that is trained and then measure the resulting effects of that manipulation on an outcome measure, such as accuracy of memory performance after the training.

Experiments require some comparison of the effects of the independent variable on the dependent variable. Often one of those treatments functions as a *control* condition. The control condition might be one in which no effect is expected. For example, if studying training strategies for memory performance in children, one might compare a group of children who received explicit training on a strategy with a group of children who received no training. The adequacy of the control condition is important to evaluate. In this example, perhaps a better control condition would be a group of children who received some other treatment that had nothing to do with memory strategy, but gave them the same time and attention that the memory strategy group received.

In an experiment, an independent variable may be a variable that the researcher manipulates, such as the

comparison of various treatment conditions. An independent variable may also be a group difference that the researcher intends to investigate, such as gender or age. These variables are sometimes called *quasi-independent* variables because, although they cannot be randomly assigned, they function as independent variables in the design of the experiment.

The selection of the sample to be tested is an important feature of an experiment. If two or more treatment conditions are to be tested in different groups of people, one strategy used in order to avoid bias is to consider the entire group to be tested and then randomly assign participants from that group to one of the treatment conditions. Any resulting differences between the groups in the outcome of the study can then be attributed to the treatment differences, although it should be noted that there are always potential sources of error in an experiment, such as differences in the groups before the treatment, despite random assignment, or measurement error in the dependent variable.

Nonetheless, random assignment to conditions is a good strategy for experimental designs.

The adequacy of the dependent variable is another important factor in experiments. Does the dependent variable measure what the research intended it to measure, that is, does it have *validity*? And does the dependent variable have reliability, that is, is it a consistent measure of what the researcher intended it to measure?

There are various kinds of experimental designs. For example, an experiment may use comparisons between people in different groups that have been tested with different treatments. This is a *between-subjects* design. Another type of experiment might test one group of people in several conditions and compare the effects of conditions. This is a *within-subjects* design. In research on human development, some studies test the same group of people at different ages in order to assess changes that occur with age. This is a *longitudinal* design. Other studies test different age groups in order to draw inferences about changes that occur with age. This is a *cross-sectional* design.

The opportunity to draw inferences about cause and effect is important in scientific reasoning. Some studies are not true experiments because they do not measure such cause-and-effect influences of independent variables on dependent variables. For example, suppose that a group of high school students' participation in extracurricular activities is measured, and data from those students are split into two groups, based on whether the student's grade point average (GPA) was high or low. Perhaps the number of extracurricular activities would be greater for the high-GPA than for the low-GPA group. Would it be correct to conclude that GPA *caused* differences in extracurricular activity? No. In this hypothetical example, we can describe a relation between GPA and extracurricular participation, but cannot demonstrate causality. Such studies may be legitimate and informative, but they are not true experiments.

Experiments with human participants and experiments with animal participants are subject to ethical guidelines.

—Marie T. Balaban

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EXPERIMENTAL GROUP

To understand the function of an experimental group, one must first know what an experiment is, since that is the context in which experimental groups are found. An experiment is one of the techniques available to researchers in their study of human development. This research method attempts to determine the effect of one (or more) events or treatments on the behaviors of individuals. It accomplishes this by creating two or more equivalent groups of individuals and treating them exactly the same in all ways except for the event or treatment whose effect is being tested. If, after one group has received the treatment or experienced the event, there are now measurable differences between that group and the other(s), those differences are presumed to be due to the event or treatment.

The *experimental group* refers to the individuals who receive the treatment or experience the event that

is of interest to the researcher. The group of research participants that does not receive the treatment is called the *control group*. The treatment or event that is manipulated is termed the *independent variable*, and the participants' responses are the *dependent variable*.

To serve as an example, suppose a researcher is interested in the effects of watching television violence on children's subsequent aggressive behavior. The independent variable is TV violence, and the dependent variable is some measure of the children's aggression, perhaps the number of kicks or punches displayed against an inflatable doll during a 1-hour period. To create an experimental group, the researcher may have several children watch a 30-minute video that includes several episodes of violent acts. The researcher may have a control group of children watch a nonviolent video. The aggressive behaviors of both groups of children would then be observed and recorded, and the researcher would test whether the experimental and control groups differed in a significant way.

Many experiments employ more than one experimental group. For example, if a researcher is interested in what type of TV violence has the greatest influence on aggression, the researcher may have one group of children watch cartoon violence, a second group watch sports violence, and a third watch violence between human actors. A control group may still be included that would serve as a comparison for all three experimental groups.

Experimental and control groups are created to provide a comparison. Turning to our example again, we may find that subjects who watch a 30-minute violent video go on to display an average of 4.5 aggressive behaviors during that next hour. Only by including a control group of children who did not watch a violent video, and finding that they exhibited an average of 1.2 (or 8.9 or 4.6) violent behaviors during the next hour can we infer that the video increased (or decreased or had no effect on) children's subsequent aggressive behavior.

It is critical that experimental and control groups be as equivalent as possible before the independent variable is manipulated. The preferred method for achieving equivalence is to randomly assign individuals into groups. In our example, that would mean making sure that each child had the same probability of being assigned to watch the violent video or nonviolent video. If children are allowed to decide for themselves which video they watch, it may turn out that children who choose to watch the violent video are more aggressive to begin with.

The experiment is considered the best research method available for inferring cause and effect. Observing naturally occurring behaviors is an effective descriptive technique. But it is the intentional assignment of subjects into equivalent experimental and control groups that makes causal inference possible.

—Jack L. Powell

See also Dependent Variable, Ethical Standards of Research

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EXPERIMENTAL METHOD

Experimental method is a method in which a variable (independent variable that is hypothesized as a cause; IV) is manipulated by an experimenter and the corresponding change in another variable (dependent variable that is hypothesized as an effect; DV) is observed. To determine whether the change in the DV is caused by the IV, at least two groups are involved: a control group and an experimental group. The two groups are assumed to be identical in all respects except that the control group does not receive the treatment of the IV whereas the experimental group receives the treatment. In reality, no two groups are exactly identical. Therefore, to ensure both groups are identical except for the treatment or experimental manipulation of the IV, all participants are randomly assigned to either the control or experimental group(s). As a result, any innate differences between the members of the two groups are equally distributed.

As an example, consider a hypothetical study investigating the effect of violent TV programs on the

behavior of children. The researcher first randomly assigns a group of children to either an experimental or control group, and then shows a violent TV program to children in the experimental group and a neutral program to children in the control group. After viewing their programs, the children are allowed to play in a room with other children and observed. As a result, children in the experimental condition may exhibit more aggressive behavior than children in the control group. Given the use of a control group and an experimental group, and the random assignment of children to each condition, the researcher may be able to infer that the violent TV program caused aggression among the children since they only differed in the type of program they watched.

Experimental methods facilitate making causal inferences easier. In a well-designed experiment, the relationship between the IV and DV is clear. The experimental method can isolate the relationship among variables, which occurs in a complex environment and is often unobservable. As in the example, the effect of violent TV programs is not easily observed in real settings. By controlling all of the other variables involved, a well-designed experiment makes it possible to discern the relationship between the IV(s) and DV(s). By doing so, experiments can provide grounds for further scientific investigation. In other situations, the relationship between any two variables is weak. Because experimenters can have a lot of control in an experiment, they may maximize the magnitude of the manipulation and thereby have higher power to detect the relationship. In these scenarios, the major concern of the experimenter is the existence of the relationship. Especially at an exploratory step, this kind of evidence may provide a clue as to whether further investigation is warranted.

The experimental method is not without its shortcomings. First of all, its major advantage can often be a disadvantage. An experimenter's control over many aspects of the experiment often makes it hard to generalize the results to other situations. Therefore, the size of the effect in an experiment may not be observed in reality or in other studies. This is intensified because many variables are intertwined with other variables. In this sense, experiments are much simpler than reality. Experimenters may try to include more variables in the design to increase the generalizability of the results; however, often the inclusion of additional variables poses a challenge to experimenters. Experiments typically require more time and effort for each participant. This might be a part of the reason why experiments are not used to collect longitudinal data. Maintaining control over participants for long periods of time may cause ethical issues, and may even be impossible.

—Simon Moon

See also Dependent Variable, Quasi-Experimental Design

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EXTENDED FAMILY

Most Americans live in nuclear families, which consist of parent(s) and unmarried children, or simply two adults related by marriage or equivalent partnership. At the same time, most Americans recognize other family members outside their nuclear families. They may be grandparents, uncles and aunts, married siblings, cousins, nephews and nieces, married children, grandchildren, or in-laws. Any family member outside one's nuclear family is called an extended family member.

Yet some Americans, often racial/ethnic minority members, share their households with extended family members. These households are called extended family households. When we examine extended family, therefore, we have to distinguish between extended family members (kins) and extended family households.

While whether or not one lives with extended family members in the same household is a structural question, we also have to examine the nature of the interaction between extended family members. They may help each other in everyday chores, economic aspects, and psychological well-being. Conversely, they may be a source of stress, due to personality conflict, economic burden, or inheritance issues. Therefore, we need to

discuss interactional/functional aspects of extended family as well.

I will examine functional/interactional issues of the extended family first, followed by structural issues.

EXTENDED FAMILY MEMBERS OUTSIDE THE HOUSEHOLD

Extended family members may get together for holidays or weddings, but otherwise, each nuclear family is quite isolated in everyday life; that's what social scientists believed. When data were first collected from American families several decades ago, however, the results were surprising. Most Americans are in close contact with extended kin, particularly their elderly parents. One research study indicates that as many as 78% of elderly people who do not live with any of their children saw at least one of them in the past week. The proportion was similar in other industrialized countries such as Denmark and Great Britain.

Extended kin also get together for holidays, birthdays, vacations, weddings, and funerals. Even if extended kin live far away, contacts are often made through phone calls, e-mails, and/or letters. In other words, in fully industrialized societies where most people live in nuclear family households, extended kinship network is alive and well. This kinship network is often called *modified extended family structure.*

This modified extended family structure exists in contemporary societies because it serves certain functions. Although each household is supposed to be, and usually is, a self-sufficient unit, it is often necessary to exchange help with extended kin who do not live in the same household.

This support may be economic. Relatively well-to-do parents may rent their residential property for a less-than-market value to their married children. An adult child may financially support his or her elderly parents who are in a nursing home. Retired parents often assist their adult children with child care, free of charge. Adult children may help their parents in everyday chores, personal cares, or transportations, all of which may be substituted by hired services.

Emotional functions provided by extended kin are important as well. Checking up on each other through visits and phone calls provides emotional support, particularly in times of hardship such as illness, death of a family member, family problems, or economic downturn. Even without any hardship, regular contacts by extended kins including visits, phone calls, e-mails, and letters often help stabilize one's emotions. Modified extended family structure is alive and well because of these functions it provides.

Dealing with extended kins, however, is not always a pleasant experience. Elderly parents may want to interfere with how the children are raised. An adult sibling may keep asking for economic assistance. Married children may cause constant heartaches by getting into trouble with drugs. Friction with in-laws is a well-known source of tension.

Like it or not, we feel a certain degree of obligation to deal with our extended kins. This sense of obligation differs from one individual to another, within each family, and within one's ethnic/racial group. We will revisit this point. In the next section, I will examine structural aspects of extended family, more specifically, extended family households.

EXTENDED FAMILY HOUSEHOLDS

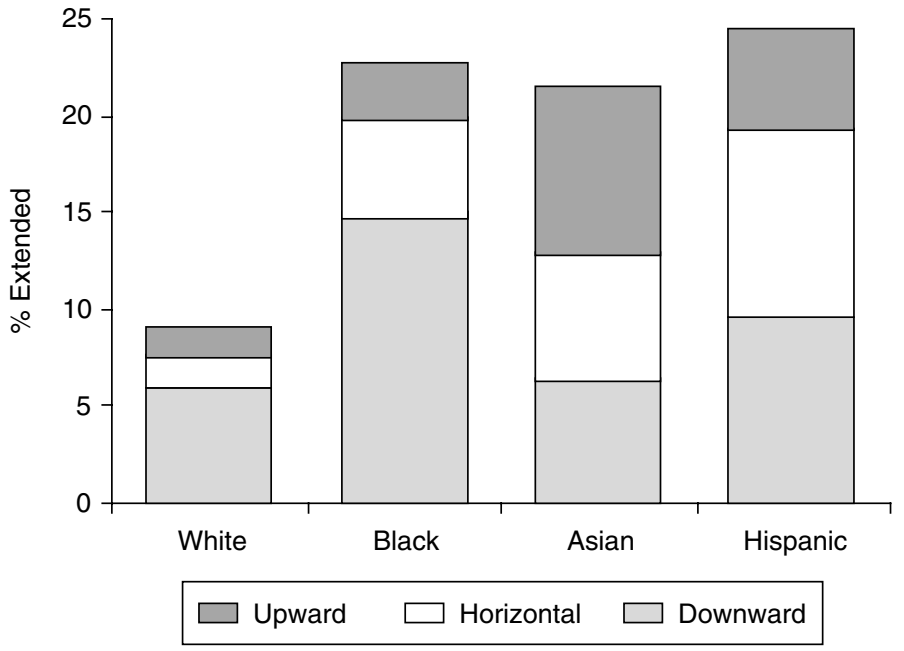
Approximately 10% to 15% of family households in the United States are extended family households. This percentage, however, is for a particular time period (called cross-sectional data). If you ask, "Have you ever lived in an extended family household?" the proportion would be much higher. This is because each household expands and contracts depending on demographic phenomena such as marriage, birth, and death.

The same is true for historical data on extended family households. While many societies held extended family household as a normative (i.e., desirable) household type, this does not necessarily assure its prevalence. People simply did not live long enough to see their children marry to someone and have their own offspring. Even when someone survived long enough to live with his or her child-in-law or grandchildren, the life span of this extended family household was usually short, so that it may not be recorded in family registry records, etc., making the proportion of extended family households appear smaller.

Thus, whether or not extended family households are formed depends on the demographic force involving that particular household. As is discussed below, extended family household formation also depends on the cultural and economic forces surrounding the household.

RACIAL AND ETHNIC VARIATION: CULTURE OR ECONOMY

Early sociologists argued that nuclear family households are better suited in industrialized societies. To



	White	Black	Asian	Hispanic
Upward	1.72%	3.09%	8.32%	4.84%
Horizontal	1.78%	5.43%	6.61%	9.86%
Downward	5.44%	14.34%	6.56%	9.69%
Nuclear	91.07%	77.14%	78.50%	75.63%
N	8,489	8,451	8,654	8,289

Figure 1 Distribution of Household Types for Each Racial/Ethnic Group

SOURCE: From "Racial and ethnic differences in extended family households," by Y. Kamo, 2000, *Sociological Perspectives, 43*, 211–229. Copyright © 2000, reprinted with permission of the University of California Press.

live competitively in industrialized societies one often has to move to wherever the new job is located. Extended family households are ill-suited for this, they argued. In many industrialized countries in Asia (i.e., Japan, Korea, and Taiwan), however, there still are many extended family households.

The prevalence of extended family households in certain countries is in part attributed to prolonging life expectancy. The female life expectancy in Japan in 2001 was, for example, 84.93 years, compared with 43.20 years in 1921–1925 (for 5 years combined). A society that has more elderly people is more likely to have a larger proportion of extended family households.

Nevertheless, this demographic force is only part of the story. The prevalence of extended family households in some countries is mostly due to their cultural factors or social norms. Most Asian countries share a Chinese tradition of Confucianism, which emphasizes respecting the elderly and taking good care of elderly parents whether they can live independently or not (filial responsibility). A typical family norm states that the oldest son lives with his parents for his entire life, taking care of them if or when they become frail or sick.

We have another interesting example of the cultural effect on extended family households in the United States among racial/ethnic minorities. It is natural to expect that Asian immigrants in the United States carried the social norm of their home country regarding family relationship and filial responsibility with them. A recent research study based on 1990 U.S. Census data tells us that Asian immigrants and their offspring are more than twice as likely to live in extended family households than non-Hispanic White Americans (22% vs. 9%; see Figure 1). More specifically, their typical extended family household is composed of the head of household, his wife and children, and his parents. Since this type of household extends upward from the head of the household, we call this *upwardly extended family household*. Since Asian Americans do not have much longer life expectancy or smaller average income than their non-Hispanic White counterparts, we cannot attribute this racial difference to demographic or economic forces. It is found that those Asians born in the United States are less likely to live in extended family households than those who were born in their home country. This indicates that the cultural force is at least partly responsible for this ethnic uniqueness.

When you examine two other racial/ethnic groups, Hispanic Americans and African Americans, an interesting pattern emerges. First of all, the percentages of extended family households are much higher among both minority groups than among non-Hispanic Whites: 24% among Hispanic Americans and 23% among African Americans, compared with 9% among non-Hispanic Whites (Figure 1).

More specifically, however, extended family households among African Americans are most likely to be downwardly extended (head of household lives with a child-in-law or grandchildren) and those among Hispanic Americans horizontally extended (head of household lives with siblings). This is in contrast to Asian Americans. Similar to Asians' filial responsibility, Mexicans have been long known to honor the idea of "familism," which places priority on the entire family's welfare over individual members' benefits. This cultural norm is undoubtedly related to the prevalence of extended family households. Those who have come to the United States are typically young and haven't established their own households. When they depend on their previously immigrated siblings in residence, we see the formation of a horizontally extended household.

African Americans are also known to have a strong intergenerational tie, often through the maternal line. When a daughter marries or becomes a mother early, she often depends on her parents by living with them, forming a downwardly extended family household. Difficult economic circumstances among young African Americans and a strong intergenerational tie both make this pattern prevalent among them.

Extended family can be examined upon either its functional/interactional significance or its structural characteristics. For the latter, we pay attention not only to demographic but also economic and cultural factors surrounding that particular family, as shown in racial/ethnic variations in the United States.

—Yoshinori Kamo

See also Family Size

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EXTINCTION

Extinction is a reductive procedure used to decrease the occurrence of a given behavior. Specifically, extinction involves withholding reinforcement for a behavior that previously received reinforcement. For example, consider the case of a teacher who falls into the habit of laughing at students' jokes. The teacher is reinforcing "joking" behavior by providing positive teacher attention contingent upon the presence of a joke. Extinction occurs when the teacher no longer laughs or responds to students' jokes.

If extinction procedures are implemented consistently, the rate of the target behavior will decrease compared to baseline, or pre-intervention levels, meaning students will make jokes less often if the teacher does not laugh at the jokes.

There are four key features of extinction procedures. First, it is necessary to identify all reinforcers for the target behavior so that all sources of reinforcement (e.g., teacher and peer attention) can be removed. Extinction requires all sources of reinforcement to be withheld when the target behavior occurs. Sources of reinforcement can be determined via direct observations. The intent of these observations is twofold. One purpose is to identify circumstances or events that may set the stage for the target behavior to occur (antecedents). Another purpose is to identify circumstances and events that follow target behavior (consequences) to promote the occurrence of the target behavior. By analyzing the antecedents and consequences associated with the target behavior, it is possible to determine the conditions that are reinforcing the target behavior.

Second, it is important to specify the circumstances when extinction procedures will be employed. The goal is to make sure that all parties (e.g., teachers, students, and parents) are clear about when and if the target behavior is acceptable and the consequences associated with violating the expectations. For example, the teacher would need to talk to the students to let them know that the joking around is interfering with instruction and learning. Therefore, jokes are no longer going to be acceptable during instructional time, but they will be allowed during free-time activities on Fridays. If joking does occur at other times, a negative consequence (e.g., time out or a note home) will take place.

Next, all reinforcement must be eliminated when the target behavior does occur. For example, it is

imperative that neither the teacher nor the students laugh at jokes that are told during instructional time. However, it is fine to respond during free-time activities on Fridays. If reinforcement is occasionally given during instructional time, this is called intermittent reinforcement. Intermittent reinforcement is actually a technique used to sustain a given target behavior. Therefore, consistency is critical. Further, the extinction intervention is not a quick procedure. Consequently, teachers and other professionals must be prepared to continue with the intervention for a reasonable length of time. Before the target behavior is eliminated, an extinction burst is likely to occur. This means that the rate or intensity of the target behavior will likely increase substantially before it gradually declines.

Finally, one should consider using other procedures to teach more appropriate behaviors that are functionally equivalent to the target behavior (e.g., reinforcement techniques). Although extinction, if implemented as intended, is likely to decrease the target behavior, it does not teach students a functionally equivalent replacement behavior. However, other techniques such as differential reinforcement procedures can be used in conjunction with extinction to teach more desirable replacement behaviors.

While extinction is an effective tool for producing lasting decreases in behavior without using more aversive reductive procedures such as punishment (introducing an aversive stimulus when the target behavior occurs), extinction procedures are characterized by a number of limitations. As previously mentioned, extinction takes time to occur and behavior often worsens before it improves (extinction burst). In addition to these limitations, extinction procedures are often associated with (a) a surge of aggressive behavior due to frustration (extinction-induced aggression), (b) imitation of the target behavior by peers, (c) spontaneous reoccurrence of the target behavior (spontaneous recovery or resurgence), (d) limited generalizability to other settings, and (e) difficulty in controlling all sources of reinforcement (e.g., peer attention).

—Kathleen Lynne Lane and Ada Lee Thompson

See also Operant Conditioning

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EXTRAMARITAL SEX

Alfred Kinsey sent shockwaves though American society in 1948 when he reported that about half of all married men had sex with someone other than their wives during their married life. In 1953, Kinsey reported that about a quarter of women had extramarital sex by their 40s. Although Kinsey's sampling methods have been questioned, other contemporary studies of marital adjustment indicated similar rates. More recently, the representative General Social Survey conducted by the National Opinion Research Center (NORC) has estimated that 21.5% of men and 12% of women have had extramarital sex, based on surveys in 1991, 1993, 1994, 1996, and 1998. These studies estimate that 5% of men and 2% of women have extramarital sex in a given year. The 1992 National Health and Social Life Survey, also produced by NORC, reported extramarital sexual experience by gender and age: 23% of males and 8% of females aged 50 to 59; 20% of males and 12% of females aged 40 to 49; 16% of males and 8% of females aged 30 to 39; and 10% of males and 6% of females aged 18 to 29.

Two of the most common reasons women report for having extramarital sex are retaliation toward an unfaithful husband and a lack of attention from or general dissatisfaction with a husband. The first reason is more closely associated with brief affairs or one night stands, the second with long-term affairs and an increased risk of divorce. Men are more likely to report opportunistic reasons for having extramarital

sex, along with relief of tension and desire for sexual variety. These reports support the notion that men are motivated by a drive for sexual variety, whereas women are motivated by a search for sexual intimacy.

The more general term used for these behaviors in diverse human cultures and nonhuman species is extra-pair copulation (EPC). The reproductive benefits of extramarital sex to men are more obvious. Men can enhance their reproductive success by fathering children with multiple women, and any genetically influenced tendency promoting this behavior would spread through the population as long as the costs (e.g., being seriously injured or killed by a woman's partner or his kin) did not outweigh the benefits in terms of reproductive success. There are also multiple ways in which EPCs can benefit women's reproductive success: acquisition of material resources; protection against injury or infanticide by the male; high quality genes that enhance offspring survival; "sexy son" genes that would make a son more attractive to females; genetic diversity of offspring as a hedge against changing or unpredictable environments; fertility backup if the woman's primary partner is sterile; replacing a lost partner; and stimulating mate guarding by the woman's partner to reduce chances for the man's infidelity.

Women are more likely to choose men with higher social status and physiological cues of high genetic quality, such as high body symmetry and broad shoulders with narrow hips, for extramarital sex, and are more likely to desire EPCs during the fertile phase of their menstrual cycle. Men are also more likely to have extramarital affairs with women possessing physiological cues of high genetic quality, such as low waist-to-hip ratios.

—Daniel J. Kruger

See also Marriage

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F

Friendship

Be courteous to all, but intimate with few, and let those few be well tried before you give them your confidence. True friendship is a plant of slow growth, and must undergo and withstand the shocks of adversity before it is entitled to the appellation.

—George Washington

FAILURE TO THRIVE

WHAT IS FAILURE TO THRIVE?

From the day a baby is born, parents will focus their attention on the child's growth and development; their major preoccupation will be connected with the baby's nutrition, health, growth, and contentment. Parents will be eager to see how much weight the baby gains, how well the baby feeds, how the baby responds to their nurturing, and what developmental progress the baby makes.

To grow satisfactorily, the baby needs sufficient nutrition on a regular basis and a quality of care that will make the child feel at ease, comfortable, and secure. In a secure and caring home, and fueled by adequate nutrition, children will thrive, giving parents pleasure and confidence in their parenting. In homes riddled with conflicting stress, chaos, or poverty, or where parents are poorly informed about children's developmental needs, the children's progress may be impaired if nutritional intake and the quality of nurturing are inadequate for the child's age.

During the first year after birth, human growth is quicker than at any other period during childhood, decreasing rapidly until the end of the third year, then continuing at about one third of its postnatal rate until puberty. However, there are some children who do not grow according to expected norms and who are cause for concern. These children have been described as failing to thrive and, compared with their peers, are significantly smaller and can be expected to have poor outcomes. They can be found in all social classes and levels of society. Without help, one can expect their physical growth, cognitive progress, and emotional development to be negatively affected, and they may be at risk for neglect, abuse, or even death.

TRENDS AND PREVALENCE

The term *failure to thrive* is applied to infants and young children whose weight, height, head circumference, and general psychosocial development are significantly below age-related norms and whose well-being causes concern. In the United Kingdom, children who fall below the second centile on the Growth and Developmental Charts (and remain there for more than a month) are investigated. In the United States, common practice is to use the fifth centile as a cutoff point for weight. Children who drop down two or more percentile curves on the weight chart over a

short period of time need to be assessed to determine whether there is a medical or psychosocial problem, such as development of a serious illness or trauma (e.g., abandonment, abuse, loss of parents).

The term failure to thrive describes a condition rather than a specific disease, and consequently it can have many causes that can be organic, psychosocial, or a mixture of both. It is conceived as a variable syndrome of severe growth retardation, delayed skeletal maturation, and problematic psychomotor development, which is often associated with illness, inadequate nutrition for normal growth, feeding difficulties such as oral-motor dysfunction, disturbed mother-child interaction (especially during the act of feeding), poor relationships, insecure attachment, family dysfunction, and poverty. Whatever the reason, these children are undernourished in terms of adequate caloric intake. Undernutrition during early infancy can have detrimental effects because the nutritional requirements at that time are most crucial. Given the rapid growth, particularly brain growth, that occurs during the first few years, particular attention should be given to sufficient provision of food.

Failure to thrive is normally diagnosed within the first 2 years of life, although its effects can be seen much later than this. Estimates of prevalence have varied from as many as 10% of children seen in outpatient clinics to 1% of all pediatric hospitalizations.

RISK FACTORS

Several risk factors have been identified that tend to trigger failure to thrive and maintain the problem if helping strategies are not put in place early on. They are as follows: inadequate intake of food; feeding difficulties; poverty; family stress, such as parental chronic illness; divorce or separation; family violence; substance misuse; single unsupported parenting; low maternal education; limited knowledge about child rearing; social isolation; maternal depression; low parental self-esteem; distorted perceptions about the child; and poor interaction between child and mother.

PROGRAM OF INTERVENTION

Intervention with failure-to-thrive cases usually falls into two basic categories: (a) immediate (crisis intervention); and (b) longer-term therapeutic and supportive work with more complex cases.

During the assessment period, attention is paid to urgent needs of the child and parents. It is sometimes necessary to arrange day care (e.g., day nursery for a child if there are developmental delays due to the lack of stimulation or when a child is at risk for being neglected or maltreated). Some families might need assistance with housing, welfare provision, health and addiction problems, employment, family frictions, and financial difficulties. These issues should be dealt with early on to reduce stress and to create an atmosphere in which further therapeutic intervention can take place.

TREATING INADEQUATE INTAKE OF FOOD

The primary objective of all failure-to-thrive cases is to increase nutritional intake by children in order to achieve subsequent weight and height expansion. Because many children have feeding difficulties, these are treated first in order to help the child to take more food and for the parents to manage better the process of feeding. Some children are simply not given a sufficient amount of food, the feeding formula is wrong, or the interpretation of the child's signals of hunger or satiation is incorrect; therefore, they are instructed and shown how, when, and what to feed. Parent training, in terms of developmental and cognitive counseling, plays an important role in problem solving in such cases.

Frequent home visits by a public nurse to support and monitor the case are very helpful. Much effort is put into making mealtime more relaxing for everybody in the family, but in particular, emphasis is put on the mother-child feeding interaction. Feeding behavior is modeled by the therapist, and food is presented in an attractive, appetizing way to encourage interest in eating and enjoyment of taking food. Because food avoidance behavior is common among failure-to-thrive children, the process of change tends to be slow. Assisting parents for a considerable time to reach successful results is necessary.

ATTACHMENT WORK

Some failure-to-thrive children are insecurely attached to their mothers, and there is lack of maternal bonding to the child. Interaction in some cases is limited to the bare essentials of care and control and tends to be negative in nature. The child's fear and apprehension when in the mother's company is observable, as is anxiety, anger, or helpless despair on the part of the mother. To bring them closer together and to reduce negative feelings, structured interaction in the form of play, increasing in time, is introduced. Rejective

mothers, and those who have a poor relationship with the child, are encouraged to hold a child, sit the child on the lap for a few minutes several times a day, and talk to the child warmly while doing so. Frequent exposure to close proximity, conducted in a calm and soothing way, tends to reduce anxiety and apprehension in the child and anger or resentment in the parents.

VIDEO RECORDING AND FEEDBACK

Video recording is a useful technique to increase parents' awareness and understanding of what is happening and how to correct inappropriate responses to the child. Examples of aversive parental behavior are videotaped and then played back to parents so they can see and hear how they behaved. Parents are asked to imagine how they would feel if they were treated in the way they are treating their child. By doing so, it is hoped that they will be able to get in touch with their own and their child's feelings, which, in turn, will help them to recognize the pain and hurt inflicted on the child. Parents are asked to observe the role-play conducted by a therapist demonstrating warm, encouraging, and caring behavior with the child. Then they are asked to play with the child again, using better interaction, which is videotaped, played back, and discussed.

COGNITIVE WORK WITH PARENTS

Cognitive therapy is used to identify and correct negative dysfunctional or maladaptive cognitions relating to the parenting of the failure-to-thrive child. An essential component of cognitive therapy is that the parents are actively involved. Thus, parents must participate in the exploration of the manner in which their behavior is guided by their own beliefs and information processing. Modeling of alternative methods of interaction or feelings may help parents widen the scope of self-imposed and child-related expectations. Cognitive work points to the successful aspects of parents' lives so that they can take comfort from those aspects and redirect their thinking to constructive strategies to solving problems and feel good about them, thus reinforcing the conviction that they are able to achieve positive change.

MONITORING FAILURE TO THRIVE

The cases of failure to thrive have to be followed until satisfactory growth velocity is acquired and maintained for at least 2 months. Additionally, parental confidence on how to deal with various problems and who to turn to if in difficulty is needed for the satisfactory outcomes.

SUMMARY

Failure to thrive is a multifactorial syndrome that has many routes and, if not identified and dealt with early on, can lead to serious physical and psychosocial consequences. Once a child's weight begins to falter and parent-child interaction is causing concern, action needs to be taken to preempt further deterioration and possible harm.

—Dorota Iwaniec

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FALSE MEMORIES

False memories is a broad term used to refer to various aspects of memory errors and distortions that involve not only misremembering specific aspects or details of our experiences but also remembering events that never took place at all. False memories can range from common everyday errors such as when you clearly remember leaving your car keys on the table but you actually put them in your jacket, to much more extreme errors such as remembering as an adult during therapy that your day care provider sexually abused you when you were a young child when in fact no such abuse actually happened. False memories can be very compelling

and seemingly real to the individual, and it is thus difficult for that person or outside observers to determine whether the memory is veridical or false. As such, the occurrence of false memories has widespread implications in legal arenas when allegations are made based on a person's recollections. A wide body of research studies has examined the circumstances under which false memories may occur, the cognitive and social processes involved in evoking false memories, and the types of individuals particularly prone to these memory errors and distortions.

WHAT FACTORS INFLUENCE THE OCCURRENCE OF FALSE MEMORIES?

Memories are not necessarily veridical recordings of our experiences. However, memory errors and distortions are rarely random. Rather, they reflect principled properties of our memory systems and arise from normal cognitive processes involved in perceiving, comprehending, interacting with others, and remembering. For example, research has shown that people will misremember what they inferred or imagined happened and believe it actually happened, such as when they read a story in which a character dropped a glass pitcher and they erroneously remember having read that the pitcher shattered (which would be a reasonable implication but not necessarily what happened). Similarly, numerous studies have demonstrated that large numbers of people falsely remember having experienced things that were not in fact presented, such as erroneously believing they heard the word "doctor" after having heard a list of words thematically related to the concept of doctor (e.g., "nurse, physician, hospital").

Imagination can have a profound influence on the accuracy of one's memory, and numerous studies have shown that imagining events that did not occur can increase the incidence of people falsely believing they did. For example, people will indicate greater confidence that they experienced a particular event in their childhood (e.g., spilling a punchbowl at a wedding) in relation to the number of times they were induced to imagine the event occurring. Likewise, vividly imagining performing various actions (e.g., breaking a pencil) can lead people to falsely claim to have actually performed those actions. The negative impact of imagination on memory accuracy is particularly marked when the imagined events are plausible and are imagined vividly and with minimal cognitive effort.

There are also important social influences on memory. False memories can arise from listening to other people's recollections and versions of what happened, with people incorporating erroneous details from the narratives of others into their own recollections.

MEMORY ERRORS IN EYEWITNESSES

The occurrence of false memories is especially problematic when dealing with eyewitnesses and crime victims. A host of research studies have examined the reliability of eyewitnesses' recollections and have shown that even in naturalistic situations in which the costs of mistakes have serious consequences, people's memories are malleable and not wholly reliable. Such research has shown that people's memories can be influenced by suggestions from others. One manner in which this happens is when subtle changes in the wording of questions bias a witness's recollections. For example, when a question asks about how fast the car was going when it *smashed* into the other car, which implies a higher-speed collision then when the question asks about how fast the car was going when it *bumped* into the other car, people remember higher speeds and even recall seeing broken glass. Another manner in which people's memories are influenced by suggestions from others is when misinformation is provided after the witnessed event. For instance, when people are asked about how fast the car was going when it went by the *stop sign*, when in fact it had been a *yield sign*, they may then misremember having seen the suggested item (the stop sign). This "misinformation effect" is enhanced by the perceived authoritativeness and credibility of the person providing the misinformation, and people can come to believe quite confidently that their erroneous recollections are accurate. The relationship between a person's confidence and the actual accuracy is not very strong in fact.

Another important factor to consider with regard to the reliability of a witness's memories is the stress and emotionality of the situation. The stressfulness of a situation can negatively affect memory accuracy, with increased violence and stress often leading to vivid but not necessarily veridical memories.

At the root of many false memories are source misattributions—that is, when people incorrectly attribute a remembered event to the wrong source, such as falsely believing you had seen something that was in fact imagined or inferred, falsely remembering having heard something that you actually read, or falsely remembering one person having told you something or performed an action when in fact it was someone else.

Memories can arise from many different sources—from our everyday perceptual experiences such as seeing and hearing, to our internal world of thoughts, feelings, inferences, and imagination. Our ability to determine the source or origin of our memories depends in part on the qualitative features that comprise that memory (e.g., perceptual details such as the color of someone's shirt or the sound of his or her voice, contextual details such as the time or place of the event, affective details such as our thoughts, feelings, and reactions), in part on our beliefs about our memories (e.g., "This seems so vivid it must have actually happened"), and in part on the specificity of the criteria we use to judge our memories. False memories therefore can arise when the features of a memory or our beliefs about what memories should seem like provide misleading cues as to the memory's true source (e.g., an event that is plausible and vividly imagined with minimal cognitive effort or attention is particularly likely to be mistakenly judged as real). Furthermore, false memories are more likely when people over-rely on a general sense of familiarity to infer that something really happened.

WHAT PREDISPOSES INDIVIDUALS TO FALSE MEMORIES?

What factors make particular people vulnerable to false memories? Some research has suggested that individual differences in imagery vividness, absorption, dissociation, and hypnotic suggestibility may be related to the incidence of false memories. These factors can increase the vividness of one's memory and bring about a focus on emotional aspects of one's memories, both of which can increase source misattributions.

Across the life span, there are also some important developmental differences in the occurrence of false memories. Young children are more susceptible to suggestion and generally show increased rates of source misattributions relative to young adults. For example, when young children are questioned repeatedly with leading questions and implanted misinformation, they may incorporate this into their memories and produce reports that can be substantially different than what in fact transpired. Children's increased vulnerability to false memories may be due to several factors, including immature memory systems in the still developing brain, limitations in their ability to conceptualize and verbalize their experiences, and an over-reliance on authority figures.

At the other end of the spectrum is an increased incidence of memory errors and distortion seen in older adults under some circumstances. Older adults tend to make more source misattributions than do young adults (confusions between actions they performed and imagined performing, what they said and what they imagined saying, and what they saw and what they imagined seeing). However, some older adults perform at levels equivalent to their young adult counterparts, whereas others show substantially higher error rates. These individual differences among people of the same advanced age are mediated in part by the overall functioning of their frontal lobes. Several studies have shown that older individuals with impairments in frontal lobe functioning show disproportionately higher rates of memory errors and distortions.

GENERAL CONCERNS ABOUT FALSE MEMORIES IN FORENSIC SETTINGS

There are several situations potentially involving false memories that are especially relevant to court cases. The overall reliability of the recollections of witnesses and victims is an important factor to consider in light of various research findings regarding the many ways in which memories can be influenced by suggestive questioning and misinformation. The increased vulnerabilities of young children to such factors is especially relevant when their testimony is the primary evidence in court cases (e.g., in cases involving sexual abuse in day care settings). Age-related memory impairments in older adult witnesses are also an issue. Another area of concern involves memories of alleged childhood sexual abuse recovered in adulthood. This is a controversial subject. On the one hand, there are cases in which the allegations are erroneous, having arisen in part from suggestive therapeutic practices such as guided imagery, hypnotherapy, and dream journaling. On the other hand, there are cases in which individuals have apparently forgotten such abuses for extensive periods of time and memories are triggered by some current life circumstance.

—Linda A. Henkel

See also Memory Failure

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FAMILY SIZE

Family size exerts an extremely strong and broad influence on development. The influence is strong in the sense that the effects are long-lasting. It is broad in the sense that it has an impact on many aspects of development, including both cognitive ability and extracognitive (e.g., personality) tendencies. The influence of family size is especially remarkable in comparison to other influences on development. Certainly the school, culture, economic background, and similar factors are notable influences, but the influence of family size is the most direct and probably the more robust. In many ways, those other influences are moderated by the family.

DEFINITION OF FAMILY SIZE

Family size can be defined in various ways. It may be defined such that all individuals within a household are included. This may include parents and children, but it may also include members of the extended family (e.g., aunts, uncles, grandparents) and sometimes people who are not related by genes. This is, of course, true when there are foster parents or stepparents living with children.

At issue is the definition of *family*, which has undergone enormous change in the past several decades. This has occurred primarily because of the increased divorce rates and the changing demographics of the United States—and the world. In the United States, immigration has increased the population substantially, and many of the immigrants have brought their own views of family and household to the United States. This holds true in many ways, including such factors as who lives in one household and what is an appropriate family size. The traditional American family from the 1950s and 1960s is no longer the traditional American family.

FACTORS RELATED TO FAMILY SIZE

Family size is related to socioeconomic status; families in the lower brackets often have larger families. It is, then, an inverse relationship. Associated with socioeconomic status, and therefore also inversely related to family size, are material and educational resources. Simply put, there are usually fewer resources in larger families. Perhaps most important is that family size is associated with family dynamics. Indeed, the impact of family size probably reflects an influence on family dynamics, including communication and discipline. Often, larger families are more authoritarian and less permissive and democratic. This in turn means that children have fewer opportunities to practice making decisions, and they may grow up thinking that their perspective is relatively unimportant.

Family size determines what experiences and resources a child will have and receive, and those in turn influence development. They are strong influences because the experiences determined by family size are repetitious. The effects on cognition and personality are for this reason said to be *overdetermined*.

Family size is in some ways a *nonshared* family influence. It is nonshared in the sense that the different siblings do not share the same family size. A first born, for example, is the only child for a period of time, at which point he or she is in a small family, but only until the next sibling is born. That second born child is never an only child but always has at least one sibling. In that fashion, the siblings do not share certain kinds of experiences. The same thing can be said about each birth-order position and family size. Other nonshared influences on development include socioeconomic status (SES) and parental age. Typically, the first-born child is raised (early in life) in the lowest SES. The parents may achieve seniority of some sort at work, and increase their income, so that siblings born after the first born actually are raised in families in higher SES. Even more certain is that first-born children have the youngest—and least experienced—parents. The parents of a second-born or subsequent

child are always older and more experienced parents than the parents of first-born children.

Much of the research on family structure focuses on one aspect of family size, namely *sibsize*. This represents the number of children (siblings) in the household. Very frequently, children reared in families with a small sibsize—few siblings—have more stimulation and need not share resources. Parental resources and attention are not divided much in smaller families, and children may benefit from adult supervision and interactions. Several cognitive indicators are in fact correlated with sibsize, again in an inverse manner, such that fewer siblings may help each child develop more mature cognitive skills.

These effects are moderated by age gap, the interval between siblings. When the gap is large, the siblings are different because of their levels of maturity, and they need not put any effort into being unique and thus earning parental attention. But when the age gap is small, the siblings may be similar in level of maturity, and they often put some effort into finding ways to be unique. Very frequently, the eldest child in a family is fairly conventional and has a traditional slant to his or her motivations. The eldest might very well excel academically, for example. When this is the case, and if the second-born child is not too much younger—a small gap—the second child tends to go in a very different direction. If the eldest child is in fact fairly conventional, the second born will often be quite unconventional and rebellious. Of course, this may change because of temperament as well as factors such as the sex of the children. If two children are both boys or both girls, they again are quite similar, and there is a tendency to try to be different and unique. If one is a boy and one is a girl, however, they are already different and need not put as much effort into being unique.

The family is quite complicated: age gap, sex of the children, socioeconomic factors, and temperaments all play causal roles and interact with family size to determine what occurs in the family and what experiences will occur.

KEY TERMS

Age interval—the gap between two siblings, usually in years

Family size—may include only biologically related individuals, or everyone regardless of relationship, within the household

Family structure—defined by family size, age intervals among siblings, and so on

Family dynamics—communication, discipline, and other interactions among family members, often determined by family size and structure

Nonshared family influences—some experiences within a family are identical for all children within the family, but many (e.g., parental experience) differ for each child

Overdetermined influence—many developments and behaviors are influenced by multiple overlapping family factors.

—Mark A. Runco

See also Extended Family

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FATHERS

Significant societal shifts in the definitions and role expectations of fathers have occurred within the past 50 years. In the decades of the 1950s and 1960s, fathers' role as the "breadwinners and disciplinarians" was the typical expectation; whereas in the decade of the 1970s, there were expectations that fathers would increase participation in the household responsibilities. In the 1980s, the idea of the nurturing and emotional father was emphasized, whereas the 1990s and the current decade have attended to finding the balance among the many different roles, including stay-at-home fathers and life as a single parent.

Many of these varied roles occurred largely in response to political and economic changes. Beginning in the 1960s and continuing into the 1990s, significant societal changes occurred that have affected the demographics of fatherhood, as divorce and out-of-wedlock births tripled the number of children growing up in homes without a father present. In 1994, 24 million American children were living without their biological

fathers, and in 2002, 40% did not have contact with their nonresidential fathers. Over several decades of research, the diverse effects of father absence on children's development have become clearer, and this research has led to an increased recognition of the unique contribution of a father's role in a child's life. The research has occurred in many disciplines and fields and has illustrated the importance of father roles in the child's development.

Some important differences now being emphasized about the father's unique role include the finding that fathers engage in more physically stimulating play with their children that involves orientation toward specific goals, with less time spent by the father on the caretaking activities. This physical play benefits children in many areas, including providing them with an understanding of their own behavior, helping them learn to regulate their own emotions, and helping them learn empathy skills by recognizing the emotional cues of others. These are all benchmarks of appropriate socialization of children and demonstrate how important a father is to healthy development. During infancy, this paternal style of interaction is shown in the infant being provided with higher amounts of stimulation while the father holds the infant, which may account for the finding that infants sometimes prefer to be held by their fathers. Additionally, children tend to prefer their fathers to act as their "playmates" because of this quality. Research with infants and fathers has also led to the discovery that infants who have involved fathers tend to display less stranger anxiety than those with noninvolved fathers. Furthermore, babies of involved fathers are more responsive socially, demonstrate more resiliency during stressful situations, and perform better on developmental tests. Very young children have also been shown to be able to differentiate between the mother's and father's roles in their lives.

Research has demonstrated that fathers who choose to be present at their children's birth can more accurately describe their baby's moods and temperament and can provide an increased understanding of a child's personality at 3 and 6 months of age. Furthermore, these fathers feel much more drawn to their child (i.e., spending large amounts of time looking or touching their newborn child). When mother-child bonding is emphasized at the cost of the early father-child relationship, there is evidence that some fathers experience their own version of the "baby blues" and that contact with the infant alleviates this. During the past few decades, there have been differing opinions as to whether there was a biological or cultural rationale for the differences between maternal and paternal interaction styles. The debate is not settled at this time, but the evidence is supportive of both.

Research has also demonstrated that there are many similarities in paternal and maternal interaction styles. As children get older and the opportunities for play activities decrease, fathers tend to engage in more nurturant caretaking, so that this appears to be a shared component between mothers and fathers during middle childhood. Similarly, fathers also are involved with school and extracurricular activities on an equal basis with mothers. Interestingly, the quality of the spousal relationship is predictive of the amount and quality of interaction between fathers and their children, with better quality predictive of more and better father-child interaction.

In addition to the immediate consequences to the child, a father's presence has an impact on the child's life that extends into long-term outcomes. Children who are not raised with fathers present have a significantly higher risk for living in poverty than children with a father and mother, and they are more likely to engage in drug, alcohol, and tobacco use. These children are more likely to fail school, have more emotional and behavioral problems that require psychiatric treatment, and are at greater risk for committing suicide. Male fatherless children are also more likely to become juvenile offenders, whereas females without fathers are more likely to be sexually active than their peers with fathers. Additionally, if fathers actively participate in their children's lives, their sons tend to be less aggressive and more expressive emotionally.

As the research began to demonstrate the negative effects of the father's absence in a child's life, a social movement emerged that involved governmental agencies, researchers, advocates, and policy makers. This social movement has led to the generation of major data collections about the father's role and the establishment of an influx of father-focused organizations.

This increasing support for additional understanding and research into the father's role was demonstrated in June 2002 when Child Trend released a report that included information on parenting practices of fathers, which was a first-of-its-kind report. This significant report provided data about the male role in the areas of fertility, parenting, and family formation. When this was released in 2002, it was the first time statistics were specifically examined regarding provision of parenting by fathers. This research led to some clarification of gender stereotypes. For example, contrary to the belief that fathers are disengaged from their children, the findings indicated that

fathers who reside with their children are quite involved, with close to 68% engaging in an outdoor activity at least once a week.

In addition to increases in data gathering, father-focused organizations have had a significant impact. Several of the organizations have focused on decreasing absenteeism of fathers and promoting the idea of the responsible father. Examples of these include the National Fatherhood Initiative (NFI) and the Fatherhood Project. The NFI has as its mission the goal of improvement in children's well-being by increasing the amount of children growing up with fathers who are involved, committed, and responsible to them. The latter initiative is involved in research and education and has as its aim to support male involvement in child rearing. It is significant in that it began in 1981 and is the longest-running national initiative on fatherhood.

As this social movement has become energized, there have been other significant changes within the past decade, one of which is that the number of fathers being defined as primary caregivers has risen. The 1993 U.S. Census reported that 1.9 million fathers were the primary caregivers to their children. This number is further supported by increasing numbers of conferences for stay-at-home fathers.

Another interesting aspect of the father's role is in the area of male teenage parenting, which has its own set of difficulties. Research has found that although adolescent fathers and their peers who do not have children have similar attitudes, sexual knowledge, and behavior generally, adolescent fathers are quite likely not to live with the mother of the child and consequently feel alienated from the child during pregnancy and especially in the child's younger years. However, if an adolescent father is active in early decision making about the child, he is more likely to be involved both during pregnancy and beyond. Most adolescent males, who had some level of commitment to the mother before the pregnancy, want to be involved in the child rearing, whereas those without a commitment have a lack of interest in establishing a relationship with the child and are usually not involved in raising the child.

—Tammy Lazicki-Puddy and Michael C. Roberts

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FETAL MEDICINE

Maternal and fetal medicine (MFM) is the subspecialty within the field of obstetrics and gynecology that deals with the complications of pregnancy. The problems are varied but can fit into one of several categories:

- Maternal disease: either the disease or the treatment may affect the fetus or pregnancy (e.g., diabetes and hypertension).
- Disease arising as a result of the pregnancy (e.g., preeclampsia and gestational diabetes)
- Abnormalities of the fetus (e.g., birth defects) or of fetal growth
- Genetic disease that has no meaningful effect on fetal life but that may affect the life of the individual after birth (e.g., cystic fibrosis or Down syndrome)
- Abnormalities of the pregnancy (e.g., prematurity)

Fetal ultrasound is a tool that is used in every category listed because it can provide a wealth of information concerning fetal condition, or it can provide guidance for intrauterine tests and treatments. Other tools used in MFM are the tools used by all physicians in the evaluation of a patient, such as taking a medical history, performing a physical examination, using laboratory testing, and using various imaging techniques on the mother.

Training in MFM requires completion of a 3-year fellowship. Completion of a 4-year residency in obstetrics and gynecology is a prerequisite for fellowship training.

MFM specialists practice in a variety of situations. Private practice of the specialty is common, but MFM specialists may be hired by hospitals or managed care organizations and can be found on the faculties of medical schools. The MFM specialist is often involved in teaching and research. Other aspects of obstetrics and gynecology may be practiced along with MFM, and it is not uncommon for the MFM specialists to give complete obstetrical care to patients with specific problems.

Historically, successes in the treatment of pregnancy complications came with the ability to diagnose, treat, and ultimately prevent fetal disease related to Rh incompatibility. Care of the pregnant diabetic woman was begun in the 1930s. The modern treatment of the diabetic pregnant woman began in the 1970s. It was realized then that very tight control of maternal blood glucose could prevent many problems, of both the mother and the fetus, which had otherwise been so devastating. Hypertensive disease in pregnancy remains a problem, but management generally allows a good outcome. The advent of the acquired immune deficiency syndrome (AIDS) epidemic required much research into the factors related to spread of the virus to the fetus.

Increases in the resolution of ultrasound have had a dramatic effect on the methods used. It is now possible to estimate the risk for Down syndrome by visualization of the thickness of the skin of the fetal neck at 12 weeks' gestation, and current research is assessing use of the size of the fetal nasal bone in the first or second trimester for the same indication. Three-dimensional visualization is commonly available, and we continue to try to identify ways to exploit new technology in fetal diagnosis.

Treatment of the fetus is often accomplished with the control of the maternal problem. Although some treatments include delivery of a fetus before complications cause fetal injury, in other situations we may also attempt to prevent a premature delivery. Antiarrhythmic drugs may be given to the mother to control problems with the fetal heart rhythm, and fetal surgery done on the fetus may confer striking benefits in the relatively rare situations in which it is indicated. In some cases, the treatment options are profoundly limited or the situation is judged hopeless. Termination of pregnancy may be deemed appropriate by the parents in these circumstances.

—Glenn Herman

See also Infancy

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FETUS

During the prenatal period, a human develops from a single cell to a complex array of living tissues and structures. Every experience a prenatal organism has, and every substance it encounters, can potentially alter the course of development. This period of dramatic changes sets the stage for postnatal outcomes, from birth to death. The longest period of prenatal development is referred to as the *fetal period*, during which time the developing organism is called a *fetus*.

WHEN DOES THE FETAL PERIOD BEGIN?

The first 2 weeks of life are called the *period of the zygote*. This period begins when a sperm and egg unite their genetic material in a single cell. The newly fertilized egg spends the first week of its existence traveling down the fallopian tube toward the uterus. As it travels, the original cell divides into multiple cells. The zygote spends the second week of its existence implanting into the wall of the uterus, which triggers hormonal changes in the mother to help maintain the pregnancy.

Once uterine implantation is complete, the developing organism is called an *embryo*. The *period of the embryo* lasts from week 3 to week 8. During this time, the embryo develops physical features that make it look human, such as eyes, ears, arms, and legs. Inside, the internal organs begin to form and function. The heart begins to beat within the first 3 weeks of gestation.

The final and longest stage of prenatal development is called the *period of the fetus*. This period begins during the ninth week, when bone cells begin to replace cartilage, and will last until birth. During

this time, the fetus will increase rapidly in size, growing from little more than an inch in length to the size and appearance of a newborn infant.

WHAT HAPPENS DURING THE FETAL PERIOD?

Physical Changes

At the start of the fetal period, all of the organs have been differentiated. The task of the fetal period is to strengthen and integrate their functioning. In other words, the pieces are in place; all that is left are the final touches. One way to conceptualize these changes is to consider pregnancy as occurring in three trimesters, with each trimester lasting 3 months.

First Trimester

The first month of the fetal period is the last month of the first trimester. The fetus doubles in length during this time and begins to take on more human characteristics. The head becomes more erect, and the back straightens and becomes less curled in appearance. As the body grows bigger, the fetus's large head looks more proportional, although it is still one third the length of the entire body. Details such as fingernails and toenails are added during the third month. The skin becomes less transparent, and facial structures move into place. Eyelids form, although the eyes will not open until later.

Connections form between muscles and brain, which allows for more coordinated movement patterns. Bone cells begin to manufacture blood cells. The digestive system begins producing insulin and digestive enzymes. The fetus is moving toward life outside of the womb.

Second Trimester

At the start of the second trimester, gender can usually be determined by ultrasound, the use of high-frequency sound waves that produce an image of the fetus. Sexual development actually begins much earlier, during the embryonic period, when the testes begin to form in male embryos and ovarian follicles form in female embryos. During the third month of gestation, the testes release testosterone, which triggers male embryos to develop a penis and scrotum. Because female fetuses have no testes to release these hormones, female fetuses develop a vagina about a week after male fetuses develop a penis.

A second important event during the second trimester is the onset of sensory functioning. In mammals, the sensory systems become functional in an invariant sequence. The sense of touch begins at about 8 to 10 weeks of gestation. Maria Fitzgerald at London University has found that fetuses have more irritable nerve fibers than do newborns, which may make them more responsive to prenatal stimulation. Taste and smell begin to function at about 14 weeks. Fetuses show facial responses to sweet or bitter chemicals injected into the amniotic fluid. Fetuses show visible responses to sound as early as 24 weeks, with a preference for high-frequency sounds that will last throughout infancy. Fetuses respond to light by 26 weeks, although the ability to focus will continue to improve following birth. The eyes of the fetus and newborn will remain blue until a few weeks of postnatal light exposure activate the eye pigmentation to create the adult eye color.

Physical details are also added during the second trimester. For example, fingerprints form by the fourth month. During the fifth and sixth months, eyebrows, eyelashes, and hair appear. During this same time period, the fetus's skin is protected from the amniotic fluid by vernix caseosa, a thick, waxy covering. Vernix sticks to the skin because the fetus's skin is covered by downy hair called *lanugo*. Lanugo will decrease in the seventh month, replaced by head hair, whereas vernix will still be visible at birth on the infant and in the amniotic fluid.

Third Trimester

The final trimester is when the fetus gains the most weight and length. The bones harden, consisting of more bone cells and less cartilage. A layer of fat grows under the skin, which will help the newborn infant stay warm in the postnatal environment. Hair, fingernails, and toenails grow. The fetus is also taking advantage of antibodies in the mother's blood. These antibodies enter the fetal circulatory system through the umbilical cord and provide protection for newborn infants until they can develop antibodies of their own.

The typical length of gestation is 38 weeks; however, babies born before this time can survive. The point at which a fetus can survive outside of the womb is called the *age of viability*. With today's technology, the age of viability can be as early as 22 weeks of gestation, although premature infants often face challenges that

Table 1 Fetus Developmental Changes in the Three Trimesters

Fetal Period	*Developmental Changes*
First trimester	• Major organs develop • Posture straightens • Body increases in size • Fingernails and toenails begin to grow • Skin becomes less transparent • Facial structures begin to move into final position • Connections form between muscle and brain • Bones begin to manufacture blood cells
Second trimester	• Almost all nerve cells created • Testes or vagina forms • Sensory systems become functional • Fingerprints form • Eyebrows, eyelashes, and hair appear • Lanugo and vernix caseosa appear
Third trimester	• Primary gain in weight and length • Bones become harder • Subcutaneous fat appears • Fetus receives maternal antibodies • Lungs finalize their development

full-term infants do not face. For example, lungs finalize their development, becoming capable of breathing air at about 26 weeks. Infants born before the final trimester need assistance breathing. The earlier a fetus is born, the more developmental challenges it is likely to face.

Behavioral Changes

The human fetus is an active creature. It kicks, rotates, and somersaults. The fetus also can turn its head, make faces, form a fist, suck its thumb, and curl its toes. The capability for movement begins during the second month of life; however, much of this early movement is spontaneous rather than in response to environmental stimulation. During the fetal period, movement begins to become more intentional and responsive. By the end of the second trimester, the fetus will make sucking motions in response to a touch on the lips and will shield its eyes in response to a bright light.

Some researchers have argued that behavioral patterns may tell us something about a fetus's personality or later behavior. For example, Janet DiPietro and her colleagues demonstrated that male fetuses tend to be more active than female fetuses, which is a difference often noted in young children. Fetuses of women who report high levels of stress also exhibit higher levels of prenatal behavior. Each mother may notice a behavioral pattern that is unique to her fetus, with some fetuses being awake and active at certain times of the day and not at others.

Movement can be an important developmental tool because the ability to move increases as a consequence of movement itself. For example, as the fetus swallows and inhales amniotic fluid, it is strengthening the muscles it will use to breathe air in the postnatal world. Bones and muscles gain strength and function through their use, so that movements transition from being uncoordinated to smooth and coordinated.

Movement increases in frequency until about 17 weeks of gestation, at which time it declines. This reduction in movement may be the result of the maturation of inhibitory abilities in the brain. Movement peaks again between weeks 26 and 32, and then declines as delivery approaches. The reduction in movement that occurs late during the prenatal period is most likely due to space restrictions in the uterus. Early in development, the fetus moves freely in its amniotic sac. By the end of late prenatal period, the fetus fills the expanded uterus, and its movements can be seen through the mother's abdominal wall. In preparation for birth, most fetuses move into an upside-down position, with their head pointed in the direction of the birth canal and their face angled toward their mothers' spine.

Cognitive Changes

The nervous system, which includes the brain, is also rapidly developing during the fetal period. By the end of the fifth month, almost all of the brain cells that a human will have in his or her lifetime are already created. These brain cells are called *neurons*. Neurons that are used will develop connections with other neurons, whereas neurons that are not used will be pruned. One brain area that grows the most is the cerebral cortex, the outer surface of the brain that is more developed in humans than in other species. This growth will continue during infancy and childhood.

Important aspects of brain growth occur during sleep. We now know that fetuses not only sleep, they also dream. Dream sleep, also called rapid-eye-movement (REM) sleep, is the time when neurons form

connections. These connections are even more critical to cognitive functioning than is the number of neurons an individual has. REM sleep is also a time when areas associated with learning show high levels of activity.

Research with both humans and animals has demonstrated that fetuses can learn in the womb. In a classic study by Anthony DeCasper and Melanie Spence, mothers read *The Cat in the Hat* out loud during the last 6 weeks of pregnancy. After birth, their infants could suck on a nipple to hear recordings of their mother reading this familiar story or an unfamiliar story. The infants who had heard *The Cat in the Hat* during the prenatal period sucked on the nipple in order to hear the familiar story. This behavior suggests that the infants remembered what they had heard while they were still fetuses. Prenatal learning may also explain why newborns prefer hearing their mother's voice instead of other voices and prefer hearing their native language instead of other languages.

WHAT DOES THE MOTHER EXPERIENCE DURING THE FETAL PERIOD?

Although drastic changes are occurring to the fetus, the expectant mother may not feel like she is carrying another person in her body early during pregnancy. Her hormones, however, are already changing her body to maintain the pregnancy. One of the first symptoms she may experience is morning sickness, which typically occurs during the first trimester. Morning sickness may protect an expectant mother by making her more reluctant to eat foods that would be potentially harmful to the developing fetus. Women who experience morning sickness are less likely to miscarry or have a child with birth defects.

At about the 16th week of gestation, as the fetal bones begin to harden, the mother is able to feel the fetus moving. The detection of the first movement is called the *quickening*. First-time and heavier mothers may wait longer to feel this first movement. Early movements feel like a slight flutter or bubbling sensation. As the fetus develops, the movements get stronger, and the space in which to move gets smaller. Thus, later movements feel more recognizable, such as a small person kicking the abdominal wall.

As the fetus grows, the demands on the expectant mother increase. Her heart will get stronger and beat faster in order to supply nutrients and oxygen to the developing fetus. As the fetus grows, it will compress the organs in her chest upward, into smaller and smaller spaces, leaving the mother short of breath. During late pregnancy, the fetus drops lower in the pelvis. This change in position alleviates some of the pressure on the lungs but increases pressure on the bladder, resulting in more frequent urination.

The growth of the fetus also contributes to weight gain during pregnancy. The average woman will gain 25 to 30 pounds during a healthy pregnancy. Women who are very thin at the outset of pregnancy may gain more, whereas women who are overweight at the outset of pregnancy are often encouraged to gain less. During the final trimester, when the fetus is gaining length and weight, the mother may gain a pound per week. About two thirds of her ultimate weight gain will reflect the weight of the fetus, placenta, expanded uterus, and supporting fluids (e.g., blood and amniotic fluid).

THREATS TO FETAL AND MATERNAL HEALTH

Prenatal development is a complicated and delicate process, which can be disrupted by harmful substances ingested, inhaled, or absorbed by the mother. These substances are called *teratogens*. The effect that a particular teratogen will have depends on many factors, such as amount, duration, and timing of the substance. Even small amounts of substances that are tolerable to adults may be detrimental to developing organisms. The embryonic period is typically considered the most vulnerable period of development because body structures are being created during that time. The risk for developmental damage is usually lower during the fetal period, yet there are some organs and systems that are particularly susceptible.

Determining the exact results that a substance will produce is a challenging field of research. First, many risk factors occur simultaneously. For example, a woman who is taking illegal drugs may also have poor eating habits, which makes it difficult to determine which behavior resulted in a specific consequence for the fetus. A second issue for research is that genes and environment interact. For example, fetuses with a particular gene and whose mothers smoke are more likely to develop cleft palate. Third, many consequences do not appear immediately. Delayed consequences are called *sleeper effects*. For example, embryos and young fetuses exposed to DES (diethylstilbestrol), a drug given to prevent miscarriage, do not show symptoms until adulthood, when women are at risk for cervical cancer and both men and women are at risk for fertility problems.

Drugs

The term *drug* can be applied to a wide variety of substances, from prescription medication to over-the-counter remedies to illegal chemicals. Drugs from any of these categories have the potential to be harmful to a developing fetus.

Illegal and Prescription Drugs

Illegal drugs can alter the course of development as well as create a dependency in the developing organism. For example, prenatal exposure to cocaine is linked to premature birth, low birth weight, respiratory problems, and heart deformities. Fetuses exposed to heroin show withdrawal symptoms at birth, including vomiting, shaking, and irritability. Heroin continues to exert negative effects by slowing the rate of motor development.

A classic example of a prescription drug that proved harmful is thalidomide. Thalidomide was widely prescribed in the 1950s and 1960s as a mild sedative and antidote for morning sickness. At that time, doctors believed thalidomide to be harmless to the developing fetus. Unfortunately, thousands of exposed infants were born with limb defects, deafness, facial deformities, dwarfism, and brain damage. Many of these infants died during the prenatal period or shortly after birth. Thalidomide has recently received renewed attention, because of its ability to treat symptoms of nausea, cancer, and leprosy. Controversy exists over whether such drugs can be administered with a guarantee that they will not be made available to pregnant women.

Nicotine

Any form of tobacco (e.g., cigarettes or chewing tobacco) can have negative consequences for both the expectant mother and the fetus. Nicotine interferes with the woman's ability to absorb certain nutrients and also causes her blood vessels to contract. When blood flow is constricted, the fetus receives less oxygen and nutrients. Nicotine has also been shown to disrupt fetal sleep patterns, particularly REM sleep. Women who smoke are more likely to have abnormalities of the placenta and to miscarry. Infants who are born of smoking mothers are more likely to have low birth weight, respiratory illness, or cleft palate. Smoking has also been linked to sudden infant death syndrome (SIDS) and attention deficit hyperactivity disorder (ADHD). Even exposure to secondhand smoke has been linked to outcomes such as asthma, bronchitis, and ear infections.

Alcohol

According to the Academy of Pediatrics, about 20% of women consume alcohol while pregnant. Some controversy exists about whether small amounts of alcohol are dangerous during pregnancy; however, research clearly demonstrates that large amounts of alcohol consumption are unsafe for the developing organism. One of alcohol's most damaging effects is that it interferes with cell division and cell communication, both critical components of development. Alcohol also decreases the blood supply to the fetus. Because the amount that is considered harmful is not presently known, the best advice for a pregnant woman is to avoid alcohol.

Large amounts of alcohol consumption, considered to be more than 4 ounces several times a week, result in a pattern of deficits called fetal alcohol syndrome (FAS). Children with FAS tend to have slow development, mental retardation, behavioral problems, and heart problems. In addition, FAS results in a small head with an atypical facial pattern of widely spaced eyes, a thin upper lip, an upturned nose, and a flat nose bridge. Children who exhibit these characteristics to a lesser degree have fetal alcohol effects (FAEs) or alcohol-related neurodevelopmental disorders (ARNDs). These less severe effects can include low birth weight, heart and respiratory abnormalities, attention problems, learning disabilities, and behavioral disorders.

Infectious Disease

Pregnant women may be exposed to viral or bacterial infections, such as the common cold or the flu, that do not adversely affect development. However, some infections, such as syphilis, rubella, and toxoplasmosis, can directly affect the development of the fetus. Other infectious diseases, such as gonorrhea and genital herpes, target the fetus as it passes through the birth canal into the postnatal world. Acquired immune deficiency syndrome (AIDS) is a disease that can affect the fetus in the womb and the infant passing through the birth canal.

Syphilis is a fatal disease for the developing organism. About 50% of fetuses of infected mothers die during the prenatal period or shortly after birth. Survivors are at risk for problems with their central nervous system and damage to their teeth and bones.

Rubella, or German measles, has differential effects depending on the time of exposure. Rubella is most damaging during the first trimester, when it can cause a range of defects including blindness, deafness, mental retardation, and heart defects. During the second trimester, rubella is associated with hearing and vision loss as well as language difficulties. Today, most children receive a vaccination for rubella, which means most pregnant women have been protected against the disease.

Toxoplasmosis also has differential effects depending on the timing of exposure. Pregnant women may contract this parasitic infection through eating undercooked meat or from touching the feces of infected cats. During the first trimester, toxoplasmosis causes death or severe eye or brain damage, whereas later exposure leads to less severe damage of the same areas. Pregnant women are advised to make sure that the meat they eat is thoroughly cooked and to avoid contact with any area where cats defecate (i.e., litter or soil).

AIDS is a viral disease that is transmitted to some fetuses, but not to others. The factors that determine which fetuses will contract it are not completely understood. Fetuses that do contract it quickly show symptoms. As young infants, they are prone to respiratory illnesses, fever, weight loss, delayed development, and motor disturbances. Most infants with AIDS die within the first year of life. The only drug currently available (AZT) that reduces the chances of prenatal infection also can cause birth defects.

The infectious diseases discussed thus far have noticeable effects on both the mother and the fetus; however, minor bacterial infections have been identified as one of the leading causes of premature labor. For example, women with gum disease have six times as high risk for premature birth as women without gum disease. Bacterial vaginosis, a disease treatable with antibiotics, also increases the risk for premature birth. For the healthiest pregnancy, all types of infections should be avoided.

Table 2 Threats to Fetal Health

Teratogen	*Potential Consequences*
Drug	
Alcohol	Low birth weight, arousal and attention difficulties, delayed development, mental retardation, behavioral problems, heart problems, respiratory abnormalities, atypical head and facial features
Cocaine	Premature birth, low birth weight, respiratory problems, heart deformities
DES	Fertility problems, ovarian cancer
Heroin	Withdrawal symptoms, delayed motor development
Nicotine	Disruption of fetal sleep patterns, abnormalities of the placenta, miscarriage, premature birth, low birth weight, respiratory illness, cleft palate, sudden infant death syndrome (SIDS), attention deficit hyperactivity disorder (ADHD)
Thalidomide	Limb defects, deafness, facial deformities, dwarfism, brain damage, death
Disease	
AIDS	Immune system deficiencies, respiratory illness, fever, weight loss, delayed development, motor disturbances
Rubella	Blindness, deafness, mental retardation, heart defects, language problems
Syphilis	Central nervous system problems, teeth and bone damage
Toxoplasmosis	Miscarriage, premature birth, low birth weight, jaundice, cognitive deficits
Environmental Hazard	
Methyl mercury	Motor disturbances, abnormal reflexes, mental retardation, blindness, deafness

Environmental Hazards

A fetus can also be at risk because of exposure to natural or man-made chemicals in the everyday environment. For example, a study done on farmers in Wisconsin found that women with higher levels of exposure to pesticides had higher levels of miscarriage and were more likely to have children with leukemia, brain tumors, and other birth defects.

Of recent concern is the amount of methyl mercury found in fish. Methyl mercury exists naturally in the environment, and small amounts are not harmful to developing organisms. Levels have risen in recent years because of industrial by-products invading water supplies and being ingested by fish, particularly large fish. Fetuses exposed to methyl mercury through their mother's diet are at risk for motor disturbances, abnormal reflexes, mental retardation, blindness, and deafness.

Additional Risk Factors

Age

Increased age at pregnancy is associated with increased risk for developmental problems. Beyond the age of 35, a woman is more likely to have a child with Down syndrome, owing to chromosomal abnormalities in her egg supply. The closer a woman moves toward menopause, the more likely hormonal changes will make the uterus less receptive to implantation by a fertilized egg. In addition, older women are more likely to have health problems, which during pregnancy can lead to complications such as high blood pressure, gestational diabetes, and premature birth.

Having a child early in life may also be associated with difficulties. Adolescents are still in the process of growing and increasing bone mass. Pregnancy takes resources from the adolescent's developing body in order to meet the demands of the growing fetus. One consequence is that adolescent mothers are at increased risk for osteoporosis later in life as a result of sharing calcium during pregnancy. Adolescent mothers are more likely to have infants born prematurely or at low birth weight. Adolescents also have fewer financial resources and are less likely to receive prenatal care than are older mothers.

For most women, the peak of physical health and fertility occurs during their 20s. According to the National Center of Health Statistics, in today's society, an increasing number of women are waiting until later in life to attempt pregnancy, when the odds of conceiving are lower and the odds of problems are higher. The good news is that this behavioral change has prompted better diagnostic tools and infertility treatments.

Stress

Stress is a normal part of living; however, individual responses to stress may vary considerably. A certain level of stress may seem manageable to one individual and overwhelming to another. The perception of excess stress may cause pregnant women to exercise less, consume harmful substances (e.g., alcohol or nicotine), and eat poorly, all behaviors that can have negative consequences for the fetus.

Stress itself may also create negative consequences for the fetus. During stress, cortisol is released in preparation for a fight-or-flight response. The fetus needs cortisol for maturation of organs, such as its lungs and kidneys; however, chronic stress may lead to greater amounts of cortisol than the developing fetus needs. Dr. Nathanielsz from Cornell University argues that excess cortisol may direct the nervous system to develop a highly sensitive stress response system that overreacts to even mild stressors. Thus, prenatal experiences may design a nervous system that is easily overwhelmed, leading to a chronic stress experience during adulthood.

PRENATAL CARE

Even in healthy women, pregnancy creates additional challenges for the woman's body. Early and consistent prenatal care is important to maintain the health of both the mother and the developing fetus. Recent research by David Barker and his colleagues suggests that prenatal experiences may be the most important determinant of overall lifetime health.

Nutrition

The mother is the sole source of nutrition for the developing fetus. Thus, she must meet her own nutritional needs, while simultaneously meeting those of her child. If the woman is not getting enough nutrients, the fetus takes priority. The mother's body will go without in order to channel more resources to the fetus. The fetus also prioritizes nutrients, with the brain and other essential organs (e.g., heart) receiving the most. As a result, if a fetus lacks adequate nutrients, it may have a head that is proportionally larger than its body.

Pregnant women should increase their caloric intake by 10% to 20%, usually about 400 calories per day. The key to nutritional eating is not eating more, however, but instead choosing the right foods. Some nutrients can have harmful effects in large amounts. For example, vitamin A helps build skin, eyes, and other tissues; however, increased amounts are associated with birth defects in the face, urinary tract, and genitals. Similarly, iron helps create red blood cells, but it also interferes with the body's ability to absorb calcium and zinc.

Nutritional needs change over the course of pregnancy, in response to the developmental demands of the fetus. For example, during the first trimester, folic acid is necessary for proper development of the neural tube, which will become the brain and spinal cord. During the second trimester, calcium is an important nutrient for bones and teeth to develop properly. Protein is important during the last trimester, when the fetus is actively moving and rapidly growing.

Fetuses that do not receive adequate nutrition are at risk for premature birth, low birth weight, physical defects, nervous system problems, and immune system deficiencies. Nathanielsz argues that the nutritional content of the womb may have even longer-lasting effects by providing information to the developing organism about the scarcity or abundance of resources. In response, the developing nervous system alters its metabolism to either conserve or utilize calories, a program that will continue in the postnatal world. A combination of abundant postnatal food supply and a nervous system designed to conserve calories may explain childhood and adult obesity.

Exercise

Exercise can be beneficial for pregnancy and labor. Good cardiovascular health enables the mother's circulatory system to meet the increased demands of providing nutrients and oxygen to two people instead of one. Exercise is also linked to mood elevation and decreased stress levels, which may help the expectant mother to avoid other methods of reducing stress, such as smoking or drinking. Researchers have shown that exercise is related to higher birth weights and shorter, less painful labor. Shorter labor decreases the risk for complications that can affect the emerging fetus.

Although exercise is known to be beneficial, certain cautions exist. Exercise should not leave the mother feeling breathless, dehydrated, or overheated. If the mother's heart rate gets too high, the fetus is at risk for elevated heart rate and oxygen deprivation. A doctor should always be consulted before a pregnant woman begins any fitness routine because certain conditions may require a modified exercise regime.

Multigenerational Effects

Poor prenatal care can affect several generations. For example, a malnourished infant may have developmental limitations, which can then affect that individual's reproductive ability and fitness later in life. The notion of multigenerational effects is particularly relevant for female fetuses. A female infant will be born with all of the eggs that she will ever have. Thus, that infant's genetic contribution to her own offspring is formed while she is in her mother's womb. In this way, an unhealthy womb can affect the current offspring and the generation that is housed in that offspring's eggs. As argued by David Barker and colleagues, the prenatal care a woman received while still in the womb may be a better predictor of her offspring's health than will the prenatal care she gets while pregnant.

SUMMARY

The fetal period, which constitutes the longest portion of prenatal development, is a time of physical, behavioral, and cognitive changes. The experiences that a fetus has influence those changes and are influenced by those changes. This process of fetal development creates the framework from which the rest of an individual's life emerges.

—Merry J. Sleigh

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FINE MOTOR CONTROL

Fine motor control refers to the ability to precisely move and position the limbs, extremities, and digits (especially the fingers). Examples of fine motor control include grasping an object between the thumb and forefinger, tying shoelaces, using a spoon to bring soup to the mouth, and typing. Fine motor control is

essential to many activities of daily living (e.g., eating), educational activities (e.g., handwriting), and play (e.g., using a video game controller).

Fine motor control requires a tight link between action and the perceptual information used to prospectively ("feedforward") and retrospectively ("feedback") control movement. Although hand–eye coordination is a familiar concept in this regard, during fine motor control, an equally or perhaps more important role is played by *haptic* (touch) perception. Haptic sensory receptors (which are very densely distributed in the fingertips) are sensitive to mechanical stimulation of the skin and deeper tissues. Haptic perception plays a dual role in fine motor control—it provides the actor with *proprioception* (perception of the position and motion of the effectors) and *exteroception* (perception of touched objects or surfaces external to the body, such as a utensil grasped in the hand). Without the continuous, detailed perceptual guidance provided by the haptic system, precision actions such as threading a needle would be extremely difficult.

DEVELOPMENT OF FINE MOTOR CONTROL

Behaviors that require fine motor control begin to appear early in the course of motor development. By about 1 year, infants can grasp objects in the hand and use a precision grip (i.e., holding an object between the thumb and forefinger). During the second and third years, infants learn to perform actions such as scribbling, drawing, using utensils, and stacking blocks. Fine motor control develops more rapidly after the third year, and actions begin to appear more smoothly integrated and dexterous.

Fine motor control is often contrasted with *gross motor control*—the control of large-scale body movements. Fine motor control development depends critically on gross motor control development because fine motor control requires the ability to control gross body movements and body posture. For instance, a child cannot tie his or her shoe without being able to balance while sitting or kneeling.

Fine motor control development also depends critically on perceptual and cognitive development. Vision and haptic perception must develop sufficiently to support fine motor control development. Cognitive skills, such as the ability to form appropriate behavioral sequences, must also develop sufficiently for fine motor control to develop.

POSSIBLE PROBLEMS WITH FINE MOTOR CONTROL

Two common problems with fine motor control are developmental coordination disorder (DCD) and cerebral palsy (CP). DCD is associated with general clumsiness and problems with fine motor control. DCD affects about 6% of children in the United States. There is no single cause of DCD. DCD often accompanies other childhood disorders. CP is a cluster of chronic conditions that affects almost 800,000 children and adults in the United States. The most common cause of CP is brain trauma during pregnancy or childbirth.

Physical and occupational therapy are available as interventions for DCD and CP. Physical and occupational therapy can sometimes facilitate fine motor skill acquisition and can help individuals acquire the skills required to write and button clothing, for instance. However, individuals with DCD or CP may experience persistent problems with fine motor control, in which case continued therapeutic interventions are often required to manage the disorder.

SUMMARY

Fine motor control is expressed during actions such as writing, typing, and tying shoes. Fine motor control development is linked to the development of gross motor control, perception, and cognition. Problems with fine motor control can sometimes be treated with physical and occupational therapy.

—Michael A. Riley

See also Gross Motor Development

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FINE MOTOR DEVELOPMENT

One cannot help but marvel at the accomplishments of a skilled pianist, athlete, or craftsman. Even those without exceptional proficiencies display remarkable abilities for fine motor control. As I am typing, my fingers are moving rapidly in varying order and with remarkable spatial and temporal precision. We all perform everyday tasks, such as tying our shoes, with so little effort that we fail to appreciate how complex they are. Performance of these "simple" behaviors far outstrips the abilities of even the most advanced robots.

MECHANISMS OF FINE MOTOR CONTROL

How are we capable of performing such sophisticated tasks? The most basic units of motor organization are found in the spinal cord. These circuits provide for the fundamental coordination between muscles as well as feedback control of movement. At a higher level, a group of brain structures, the basal ganglia, act as important "amplifiers" of movement. Damage to these structures in the neurodegenerative disorder, Parkinson's disease, result in paucity of movement. Motor cortex is particularly important for controlling fine movements of the digits. It is the direct connection between motor cortex and spinal motoneurons that enable the fine, independent movements of the fingers necessary for typing or tying shoelaces. However, one could not type, play the piano, or conduct any other rapid sequence of complex movements without premotor and supplementary motor areas of the cortex. These regions are where sequences of movement are "programmed" in advance preparation for movement. Thus, during typewriting, premotor and supplementary motor areas develop a movement plan that is conveyed to the motor cortex, which in turn directs the movements of individual fingers as required. When one "visualizes" execution of a skilled motor behavior, these areas are activated, which is why previsualization and mental rehearsal of complex skills can improve performance. The cerebellum is another major structure of the nervous system of crucial importance for fine motor control. The cerebellum is best thought of as a structure that compares intended behavior, as dictated by motor cortex and the basal ganglia, to the actual output. The cerebellum acts to minimize the error between intended act and the actual behavior and also ensures proper timing of rapid movement sequences. As one reaches for a coffee cup, the trajectory of the hand is continually being modified by cerebellum-mediated error correction. The importance of the cerebellum is clearly illustrated in the effects of alcohol intoxication, which profoundly affects cerebellar function. The coffee cup gets knocked over instead of being picked up, and typing becomes error prone. Maturation of these different parts of the nervous system are thus of critical importance for the development of fine motor control.

DEVELOPMENT OF FINE MOTOR CONTROL

First 6 Months After Birth

The first 6 months after birth are dominated by spinal reflex mechanisms because brain mechanisms of motor control have yet to mature. So, for example, independent control of the digits is not possible. Instead, touching the palm of the newborn elicits a grasping reflex in which all digits act as a unit. Amplitude, direction, and force of movements are poorly controlled, and there is little evidence of goal directedness. Fundamental rhythms of movement that will later become organized into locomotion and other rhythmic behaviors are present, as are basic patterns of flexor–extensor alternation. Control of movement of the limbs progresses in a proximal to distal pattern, so that maturation of control of the shoulders and hips is more advanced than that of the fingers and toes. Infantile reflexes constitute a large part of the coordinated activity of newborns, but their relationship to later voluntary behavior is disputed. Whether they serve as essential precursors to later behavior, serve adaptive functions peculiar to the neonate, or simply reflect the state of maturation of the nervous and musculoskeletal systems is not clear. At about 6 months of age, most of these infantile reflexes disappear in anticipation of the development of voluntary control of movement. By about 6 months of age, most infants can visually direct their reach toward an object and correct that reach for movement of the object.

Development From 6 Months to 5 Years

During the period from 6 months to 5 years of age, there is remarkable maturation of the peripheral and

central mechanisms that control fine movement, which is greatly facilitated by practice and other experiential effects. Among the most notable milestones are the development of language and upright locomotion, both of which typically appear at the end of the first year after birth. It is generally thought that development of cortical areas important for planning and initiating movement and that maturation of the error-correcting cerebellum are crucial for effective execution of those movements. In the progression from crawling (belly on the floor) to creeping (belly elevated during quadrupedal locomotion) to assisted bipedal walking to independent walking, increasing demands are placed on the musculoskeletal system as well as on cerebellar assistance in maintaining balance and responses to perturbations. There is very little evidence to suggest that learning plays an important role in the onset of walking, despite the fact that this accomplishment is referred to as "learning" to walk. However, early walking is typically characterized by lifting and placing of the foot as a whole, rather than by the smooth heel-strike, rolling, and toe push-off that characterizes the adult. In early development, many movements are "mirror-image" movements, in which the intentional movement of one limb is reflected in the opposite limb. These mirror-image movements are thought to be a consequence of immature connections between the left and right sides of the cerebral cortex, which later in life serve to inhibit such movements. It is very clear, however, that after the first year of infancy, practice and learning play a large role in the acquisition and refinement of skills. During locomotion, one sees an improvement in the posture of the limbs and arms, more efficient movements of those limbs, and increasingly differentiated movements, especially of the digits. Thus, the toddler begins to grasp and throw objects. Initial attempts are not very skilled, and the result is not very effective. Toddlers typically begin to throw by stepping forward with the foot on the same side as the throwing hand rather than more effectively stepping forward with the opposite foot. Continued maturation of the motor areas of cortex and cerebellum contribute to these experience-dependent improvements. During this period, there is also increasing control of individual digits. Whereas the newborn uses all digits in unison, as the child matures, increasing control of individual digits becomes possible, so that by about 5 or 6 years of age, most children are able to tie their own shoes.

Development From 5 Years Into Adulthood

Once the basic sensory and motor controls are in place, experience and increases in muscular strength become the primary factors in the further development of motor skills. Errors in movement are detected visually and by sensory structures in our joints and muscles. Visual feedback generally tells us the effectiveness of the movement, whereas feedback from our muscles and joints tells us how we achieved that end. Both the outcome and feedback from our muscles and joints are used to improve skills. Thus, improvement of motor skills in late childhood and adolescence is dependent on maturation of peripheral tissues (e.g., muscles), but also on improving central and peripheral coordination through practice. Thus, the little league pitcher learns to throw a curve ball, or the pianist learns to play piano compositions of increasing spatial complexity (different combinations of digits) and temporal complexity (rhythms). Sex differences in skilled motor behaviors typically appear during this time and are probably due to differences in peripheral anatomy and physiology that emerge during puberty and to social influences that lead to differential practice of different skills in males and females.

There is little evidence to suggest that there is a "critical period" for learning specific skills. For every childhood athletic prodigy, there is one who did not take up the sport until high school. There is little evidence that taping a tennis racket to a 5-year-old will enhance his or her chances of winning at Wimbledon. Thus, although there are generalized benefits from engaging in skilled motor behaviors in the form of improving strength and hand–eye coordination, specific expert skills can be acquired throughout adulthood. In this context, it is interesting to note that in the past 20 years, it has become apparent that the representation of movement control in the brain is not static, but that continued practice results in increased cortical representation of the associate skill throughout adulthood.

AGING AND FINE MOTOR CONTROL

As during development, changes in fine motor skills during aging are dependent on changes in peripheral strength and flexibility and changes in central control of those skills. In the normal aging process, the amount of time it takes to preprogram fine motor sequences increases. However, this effect is much less for highly

practiced movements, probably because the earlier practice has made areas of the brain responsible for planning those movements less susceptible to decrement due to age. For example, a skilled piano player who experiences a 20% loss of motor processing ability may experience little decline in piano playing skill relative to the decline experienced for less-practiced skills (e.g., playing ping-pong). Loss of muscle strength may also play an important role in declining motor skills during aging, so that the same little leaguer who could throw a curve ball or fast ball may find a significant loss of these skills during aging. Recent findings are encouraging in that both nervous system controls and muscular strength are responsive to exercise, so that continued engagement in fine motor skills serves to minimize decline of those skills.

—Donald J. Stehouwer

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FIREARMS

This article is divided into three parts. In the first part we consider the historical background of the development of firearms, in particular the invention of gunpowder and its effect on social structures, particularly in Europe. In the second part we examine the nature of firearms and the categories that relate to their design and use. Finally, in the last part guns in the community and the thorny issue of societal control over possession and use of firearms are addressed.

BACKGROUND

History of Firearms

At its root, the history of firearms is the history of explosives.

Credit for the invention of gunpowder goes to ancient China. Ancient alchemists put minerals and plants together, hoping to make some medicine that would make people immortal. Almost by chance, the alchemists discovered that an explosion would occur if certain kinds of ores and fuel were mixed in the right proportions and heated. Inadvertently, they had laid the foundations, which would lead to the invention of gunpowder.

In November 2003, Chinese archaeologists discovered a network of caves at the Laojun Mountain in southwestern China's Sichuan Province, which was identified as a large saltpeter-manufacturing base, believed to have been used to produce gunpowder more than 1,000 years ago. According to historic records, ancient Chinese found that the mixture of saltpeter, sulfur, and carbon was explosive, which led to the invention of gunpowder sometime before the Tang Dynasty (618–907).

In the *Collection of the Most Important Military Techniques*, edited in 1044 by Zeng Gongliang, three formulas for making gunpowder were recorded, each an explosive mixture of saltpeter, sulfur, and charcoal. These have been identified as the earliest formulas for explosives. The method of powder making was introduced to the Arab world in the 12th century and to Europe in the 14th century. The explosive powder was originally used for making fireworks, but observation that compression of the powder, before ignition, leads to more powerful explosions suggested its use as a mining and demolition tool. Before too long, the capacity to maim and kill was recognized too.

Invention of Guns

In January 2001, Wang Yulang of Harbin Institute of Social Sciences went to north China's Heilongjiang province to help catalog a collection of locally gathered artifacts. In the collection, he found a blunderbuss, made of copper. The blunderbuss, 38 centimeters long and weighing 5 kilograms (about 11 pounds), was probably made about 700 years ago, possibly sometime during the Song Dynasty (960–1279). It has been confirmed as being at least 100 years older than the previously designated "oldest firearm," a similar blunderbuss, which was probably made in about 1332. The newly found weapon has two Chinese characters carved on its barrel: "Shen Fei," meaning flying magically.

The suggestion is sometimes heard that the Chinese invented gunpowder but only used it for fireworks. The earliest illustration of a cannon dates

from China around 1127, close to 150 years before the development of cannons in the West. The Song also used gunpowder to make fire lances—actually flame throwers—and many other gunpowder weapons, such as antipersonnel mines.

Once the genie—knowledge that igniting gun power that had been compressed at the end of a tube would expel a solid body with massive (and often fatal) force—had been let out of the bottle, there was no putting it back. Guns and explosive devices burgeoned.

> And that it was great pity, so it was,
> This villainous saltpetre should be digg'd
> Out of the bowels of the harmless earth,
> Which many a good tall fellow had destroy'd
> So cowardly; and but for these vile guns,
> He would himself have been a soldier.
>
> —*William Shakespeare: Henry IV, Part 1, Act 1, Sc.3*

According to one academic, Shakespeare's condemnation of "villainous saltpetre" (I.iii.60) and "vile guns" (I.iii.63) tells us more about contemporary Elizabethan anxieties (*Henry IV, Part 1* was written in about 1596) than about the new technologies of war (guns). Before the mid-16th century, gun powder had been imported to England, principally from France; however, during the reign of Queen Elizabeth I (1533–1603), gunpowder factories had been established in Surrey at Long Ditton and at Godstone in the county of Kent. Although by the early 14th century, there existed rudimentary cannons or "siege engines," historical documents suggest that the Scots were exposed to cannon fire (cannons were referred to as the "crackeys of war") in one or more battles during the reign of King Edward III (1327–1377). Nevertheless, the actual practice of warfare at the time of Henry IV (1399–1413) still depended more on the skill of archers and their deployment than upon firearms of any kind.

Despite Shakespeare's apparent abhorrence of guns and explosives (a view that continues to be shared by many people in countries around the world), it was the invention of gunpowder that brought the Feudal Age to an end. The kings of Europe used cannons, based on Chinese designs, to alter the social structure of Europe. The existence of such powerful armaments enabled kings to destroy the castles of the feudal lords (who challenged the king's omnipotence). Thus, the development of centralized nation-states was able to take place.

The existence of firearms also changed the nature of warfare forever. Although the development of the bow and arrow had removed some of the immediate need for close-quarters combat, most fighting had been undertaken by swordsmen, halberdiers, and assorted foot soldiers. Thus, the art of war before the existence of guns was easy; all the healthy men of a tribe or a nation could be marshaled and sent into the field to fight, at very short notice.

Consequently, the invention of firearms made the art of war more difficult because the process of making a citizen a soldier required a period of training. Thus, instead of every able-bodied man being ordered out to fight, comparatively small (but trained) standing armies came into being.

GUN DEVELOPMENT

Definition

Before we consider the way in which firearms have developed, it is essential that we have a definition to work with. First, the expression *firearm* does not include simple explosive devices, such as bombs, mines, antipersonnel mines, and so on. The problem is, however, that although one may apply the "I'll know one when I see one" logic to the problem of defining a firearm, most countries in the world have a slightly different *legal* definition of a firearm, which seriously complicates matters.

For instance, some legal definitions suggest that there is a distinction between a firearm and a gun, although the term *gun* is often used as a synonym. For example, from a British perspective, the term gun *legally* refers only to *smoothbore* firearms, machine guns, and naval artillery, distinguishing it from weapons that are rifled (i.e., have helical [spiral] grooves in the weapon's barrel [bore] that spin the projectile in flight and impart accuracy.) From such a viewpoint, a rifle is not a gun. By contrast, the American National Rifle Association (NRA) suggests that the British practice of restricting the term in such a way is erroneous. The NRA suggests that the term gun is properly used for rifles, shotguns, handguns, and airguns, as well as cannons. This is an insoluble semantic debate, which will not be pursued further here.

For reasons of semantic precision, we state that use herein of the term *firearm* does include guns, and offer the following definition based on NRA documents. A firearm is a rifle, shotgun, or handgun that uses

gunpowder as a propellant. The word includes machine guns. Airguns are not firearms.

Strictly speaking, in the United States, by federal definition (under the 1968 Gun Control Act), and in England (by the Firearms Act of 1968), antique weapons are exempt from such legal classification. The exemption is, however, one that relates to ownership and possession. (The word *antique* has different meanings here, too. In the United Kingdom, it refers to artifacts more than 100 years old kept as a "curiosity or ornament," whereas in the United States, the expression means firearms manufactured before 1899, a firearm for which ammunition is not generally available, or a firearm incapable of firing fixed ammunition. In the State of South Australia, the expression refers to a weapon that was made before 1900 and that was designed to fire breech-loading cartridges and for which live rounds of ammunition are not commercially manufactured; or a firearm that was not designed to fire loaded cartridges and that is used solely for curiosity, display, or ornamental purposes and not to fire projectiles. The foregoing does not alter the fact that such antique items do fall within the general and broad definition of a firearm provided earlier. In an examination of the development of weaponry, it is to a consideration of such ancient weapons and their evolution that we now move.

Historical Development of Firearms

Cannons

Early cannons, later to develop into the class of weapons known as *artillery* (or *ordnance*), were excessively dangerous. The weapons were muzzle-loaders; that is, they were prepared for firing by inserting gunpowder at the open end of the barrel, compressing it (tamping it down) at the end of the body (the chamber), and then inserting a projectile into the barrel to rest on the powder. A flame or fuse was applied to a small hole (the touch hole) at the rear of the weapon, causing the powder to explode and the projectile to be expelled.

Usually made of iron bars held together with hoops of iron, these early cannons were wider at the mouth than in the body of the barrel and fired stone balls. They had a tendency to explode when fired, and some reports suggest that they were considered so dangerous that convicted prisoners were brought from jail to operate them in times of conflict. By about 1400, cannons were cast from bronze, and the first cast-iron guns were in use by 1461.

The development of cannons was very slow. Sailors under the command of Admiral Lord Nelson at the Battle of Trafalgar (1805) and soldiers directed by the Duke of Wellington at the Battle of Waterloo (1815) used cannons that had barely changed from those described previously: cast-iron muzzle-loaders, firing balls surrounded in heavy grease clouts (to make them fit the barrel). Each of Nelson's guns required a crew of at least eight men. When a shot was fired, the gun crew hauled the heavy gun inboard with ropes, swabbed it out, and recharged it.

In 1856, Henry Bessemer (1813–1898) developed a way of mass-producing steel by a process known to this day by his name (the Bessemer process). Steel has a far higher melting point than iron, and as a consequence, it was possible to solve an ordnance problem. Muzzle-loading guns were very energy inefficient. The ball (or shot in hand and shoulder weapons; see later discussion) left the muzzle before the full power of the powder explosion had been used up, and if the charge was too great or poorly compressed, an iron gun tended to melt internally and explode.

Thus, in 1869, staff at the Royal Gun Factory in London designed a large gun with an inner steel tube in place of an iron one. There was a rapid increase in the size of cannons. The first weighed about 35 tons, but that was rapidly followed by cannons weighing about 81 tons and even one that weighed 110 tons.

The change in military capacity brought about by the invention of steel was massive. In Nelson's time, firing did not begin until ships were within a few hundred yards of one another. However, in World War I (WWI) at the Battle of Jutland (1916), the two sides were 15 miles apart when the battle commenced. Later in WWI, the city of Paris was fired on from a distance of more than 60 miles.

Loading and Firing Mechanisms

Contemporaneously with the development of cannons, smaller weapons were being developed. Muzzle-loaders like their bigger brethren, the earliest "hand gonnes" were little more than a small cannon with a similar touch hole for ignition. The user was required to place the barrel of the gun on a stand, bracing it with one hand against his chest. The shooter then used the other hand to touch a lighted match to the touch hole. This gun was notoriously inaccurate (because it was a

muzzle-loader, the shot had to be smaller in diameter than the barrel of the gun and thus, when expelled, tended to wobble about in the barrel, making the direction of the discharge very imprecise). Such guns had an effective range of only about 30 to 40 yards.

For many hundreds of years, arrow makers (fletchers) had known that if, when an arrow was made, the fletchings (usually feathers) were set at a slight angle, it caused the arrow to spin when released from the bow and to travel further and be more accurate. It is not surprising therefore that in the development of handheld weapons, rifling was first used in gun barrels during the 15th century. Nevertheless, it was comparatively rare and was not commonly found until the development of steel gun barrels and of ammunition (bullets) that accurately fit the internal dimensions of the barrels.

Generally speaking, improvements in the design of handheld weapons were mostly in connection with ignition systems.

Firing a weapon by touching a match or fuse to a small hole while at the same time holding the gun steady was excessively difficult. In addition, even if the gun could be held steady, there was no guarantee that the powder would ignite.

Although there were intervening designs, including the match lock (about 1400) and the wheel lock (1517), the key improvement was that the touch hole was moved to the side of the gun barrel, and a cup was placed at the opening with a lid on it. The cup (called a flash pan), which had a small cover to prevent the use of the firearm being affected by the weather, held a small amount of gunpowder that could easily be ignited. When the powder began to burn, some of the fire would go through the touch hole and ignite the gunpowder inside the barrel, thereby firing the gun.

Later ignition systems on guns with a flash pan were designed to ignite the gunpowder in the flash pan automatically at the press of a lever or trigger. This was accomplished by either putting the end of a burning wick into the flash pan or using a flint and steel combination to throw sparks into the flash pan (flintlocks, developed in 1612).

In 1805, the development of the percussion cap was a precursor to all modern firearms. The key feature of this ignition process is that it does not use an exposed flashpan. As a replacement for that inefficient system, the weapon is manufactured with a simple tube at the breach end, which leads straight into the gun barrel. An explosive cap (filled with fulminate of mercury, which explodes when struck) is placed on top of the tube. The flames from the exploding chemical go down the tube, into the gun barrel, and ignite the powder inside the barrel, expelling the bullet.

This new percussion cap firing mechanism was a significant development in firearms design, improving the reliability of weapons and enabling ammunition design to develop at a significant pace. The development of the percussion cap was the first stage in the development of rotating-block guns (revolvers; e.g., the Colt .45), which could be practically guaranteed to fire. By the late 1800s, commercial production of such multiple-shot side arms was well underway.

Small Arms: Handguns, Long Guns, and Machine Guns

Handguns

Handguns are small, potentially concealable weapons, commonly lightweight. Outside the military world, handguns are the usual armament for the police (in those jurisdictions where the police are usually armed) and, again in some jurisdictions, for possession in public by private citizens where an appropriate license or authority is held. Handguns with a fixed firing chamber are pistols. Pistols are sometimes single shot, particularly when used for target practice, but can also be capable of holding multiple rounds. Most pistols that hold multiple rounds are semiautomatic (a semiautomatic pistol reloads the chamber with a new round automatically once the weapon is fired, without additional action by the user; each shot fired requires operation of the trigger mechanism) or are revolvers. There are a small number of fully automatic pistols (e.g., the Glock 18 and the Mauser C96) in which a single depression of the trigger fires multiple rounds. The revolver holds a number of firing chambers in a revolving cylinder, and as with the semiautomatic weapon, each shot fired requires operation of the trigger.

Long Guns

Long guns fall into one of two categories: rifles or shotguns. A rifle has a rifled barrel and fires single bullets. By contrast, most shotguns are smooth bore (i.e., have no rifling) and fire large packets of shot or, alternately, a single slug.

Rifles are manufactured for accuracy and long-range targets and are usually aimed. Shotguns, which have large impact area with a small range, are usually simply pointed at the target.

A short rifle (commonly with rapid fire capability) is usually called a carbine. The carbine is distinguished from the submachine gun (see later) by its type of ammunition. Carbines use rifle rounds, whereas handguns and submachine guns do not.

Machine Guns

A machine gun is typically a small-caliber fully automatic weapon capable of firing bullets in rapid succession. The trigger does not have to be pulled for each round to fire; the weapon fires as long as the trigger is held down.

Machine guns are divided into two classes: light machine guns and heavy machine guns. Each of these types of weapon has a slightly different practical purpose. The former are used for laying down a wide band of continuous fire (known as a *cone of fire*) in order to suppress enemy activity; the latter are far more accurate, capable of sniping (with rapid fire) over large distances. Weapons known as submachine guns are light machine guns that fire the types of ammunition normally used in pistols.

GUNS IN THE COMMUNITY AND FIREARMS CONTROL

The issue of the presence of guns in the community and whether or not there should be controls on private ownership is a matter of enormous contention. It is not the purpose of this article to support either gun control or freedom to possess guns philosophies. It is merely to report on the two sides of an argument, common around the world, which are summed up in the viewpoints of two American organizations: the National Rifle Association (NRA) and Handgun Control Inc.

According to the NRA, the following data exist with regard to firearms ownership in the United States:

- Privately owned firearms in the United States: more than 200 million, including 65 to 70 million handguns. The number rose by 52 million during the 1990s. (Source: Bureau of Alcohol, Tobacco, Firearms and Explosives)
- Gun owners in the United States: 60 to 65 million; 30 to 35 million own handguns
- American households that have firearms: about 45%

Handgun Control, Inc. simply maintains that these data suggest, particularly when coupled with data on the volume of crime (particularly homicide) in which firearms are used, that the number of weapons in circulation is excessive and requires restriction.

The U.S. Constitution enshrines the people's right to keep and bear arms in its Second Amendment. It reads: "A well regulated militia, being necessary to the security of a free state, the right of the people to keep and bear arms, shall not be infringed."

In practice, there *are* certain restrictions on gun ownership (e.g., on "assault" weapons—a tricky term in its own right), and the laws governing gun use vary considerably from state to state.

Amending the Constitution to *prohibit* guns is rarely discussed. Many Americans view the right to bear arms as an important civil liberty, but opinion is divided between those who insist on the unfettered right to bear arms and those who advocate stricter controls. However, because the Federal Bureau of Investigation (FBI) estimates (2000) that 66% of the 15,517 murders that year were committed with firearms, and because many fatal shootings in recent years involved teenagers, *gun control* is a source of impassioned debate in U.S. politics.

The core issue is whether or not it is lawful (i.e., constitutional) to impose stricter controls on gun usage.

Proposed gun control legislation has concerned childproof locks, background checks on gun purchasers, the outlawing of some types of assault weapons, and most recently, the creation of a nationwide database of ballistic fingerprints in order to track the movement of the nation's guns.

The influential firearms lobby, headed by the NRA, believes gun ownership to be a personal and moral right and dismisses the link between gun ownership and high gun violence with its slogan "Guns don't kill people, people kill people."

Advocates of firearm control argue that the Second Amendment is anachronistic, belonging to the long-gone days of the frontier. They point to the high levels of gun-related murder and violent crime in the United States to stress the need for reform. Handgun Control Inc. retorts that "Guns don't die; people do."

The issue of removing the number of guns that are already in circulation is rarely discussed.

The Problem

Various (selected) research reports the following information:

- Homicide is the second leading cause of death among 15- to 24-year-olds overall. In this age group,

it is the leading cause of death for African Americans, the second leading cause of death for Hispanic Americans, and the third leading cause of death for Native Americans.
- In 1999, 4,998 youths ages 15 to 24 were murdered—an average of 14 per day.
- Guns are a factor in most youth homicides. In 1999, 81% of homicide victims ages 15 to 24 were killed with firearms.
- A disproportionately high number of 5- to 14-year-olds died from suicide, homicide, and unintentional firearm deaths in states and regions where guns were more prevalent.
- In a study by a Harvard research team, it was stated that across developed countries, where guns are more available, there are more homicides.
- Guns kept in homes are more likely to be involved in a fatal or nonfatal accidental shooting, criminal assault, or suicide attempt than to be used to injure or kill in self-defense.

Such apparently straightforward research findings are strongly criticized (often with some justification) on the grounds of their apparent bias toward the gun control lobby, generally on the ground of methodologic or statistical impropriety. On the other hand, despite such dispute, there is a limited amount of research offering alternative hypotheses.

The real problem here is that almost without exception, such studies are correlational. Correlational studies describe the observed relationship between instances of two events. A systematic pattern can be seen in the occurrences of events that are correlated. The relationship is expressed in the form of a correlation coefficient (a number between −1 [negative correlation] and +1 [positive correlation]). When the events involve observed frequencies of events, a positive correlation means that as one increases, the other increases as well; a negative correlation means that as one increases, the other decreases. Correlation does *not* imply causation in any way.

In other words, just because two events are correlated does not mean that one causes another, or has anything to do with the other—correlations deal only with observed instances of events, and any further conclusions cannot be inferred from correlation alone. Most statisticians accept that a strong correlation, however, does often warrant further investigation to determine causation. Many of the studies to be found in this contentious area do show correlations, but where they are quoted (they often are not), they are weak.

One contentious study conducted by Martin Killias of the University of Lausanne compared, using a database of 18 countries, the numbers of households with guns, the overall frequency of homicide, and homicide using a gun. The latter matrix produced a correlation coefficient of 0.56 (statistically significant but not excessively strong), and its identification was a significant factor in the additional restrictions placed on gun ownership in the United Kingdom. However, it is argued by opponents that there is little meaning in the extant correlation between the number of households with guns and homicides with guns because the correlation with "all homicides" is statistically not significant (0.39). This suggests that the total number of homicides is likely to be unaffected by a restriction on guns in the home; therefore, such a ban is viewed as illegitimate.

Generally speaking, the arguments of the opponents to gun control revolve around the idea that the blame for gun homicide lies with the persistence of violence in the United States, and not with ease of access to guns. Violence is seen as being the consequence of poverty (particularly in the poorer Southern states) based on the cycle of government dependency; broken families; the failure of public education; and the cultural disintegration that has allegedly been taking place for decades. The federal government is seen, from such a perspective, as being largely responsible for this state of affairs.

There is a certain irony in the fact that those who advocate the freedom to own (and use) weapons, who are usually defined as conservatives and are seen as being on the right wing of political thought, use the shibboleths of the liberals (left wing) in their explanation of violence and gun-related homicide.

—Ian K. McKenzie

See also Injuries

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FIVE-FACTOR MODEL OF PERSONALITY

Personality traits are patterns of thoughts, feelings, and behaviors that are relatively enduring across the life span. The history of personality psychology has witnessed the birth of numerous traits and trait models of personality. In the 1980s and 1990s, the five-factor model (FFM) ascended to popularity and is considered by many personality psychologists to offer a comprehensive trait taxonomy.

The traits that constitute the FFM are extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness. Extraversion, sometimes referred to as *surgency*, is indicated by assertive, energetic, and gregarious behaviors. Neuroticism is essentially equivalent to emotional instability and can be seen in irritable and moody behaviors. Openness to experience, sometimes referred to as *intellect,* indicates an individual's inquisitiveness, thoughtfulness, and propensity for intellectually challenging tasks; whereas agreeableness is indicated in empathic, sympathetic, and kind behaviors. Finally, *conscientiousness* refers to an individual's sense of responsibility and duty as well as foresight.

The FFM was developed largely on the basis of the *lexical hypothesis,* which suggests the fundamental traits of human personality have, over time, become encoded in our language. Following this hypothesis, the task of the personality psychologist is to cull the essential traits from the thousands of adjectives found in language that distinguish people according to their behavioral dispositions. The lexical hypothesis can be traced back to the 1930s, and the advent of multiple factor analysis in that same decade provided an empirical method for culling these verbal descriptions. In the latter half of the 20th century, personality psychologists in fact relied primarily on factor analysis to discover and validate many of their trait theories. A large number of personality psychologists have concluded that the FFM represents the most successful outcome of these efforts.

Three lines of research have provided support for the construct validity of the FFM. First and foremost, the five factors have consistently emerged from factor analyses conducted on numerous data sets composed of descriptive trait terms from a number of languages, including English, Chinese, and German. Second, twin and adoption studies have revealed a substantial genetic component (as high as 79%) to the five factors. Third, the five factors have been applied across the life span. For instance, studies have shown that children use the five factors when freely describing themselves and others, and parents' natural language descriptions of their children can be classified according to the five factors. Individuals' relative standings on the five factors have also been shown to be fairly stable across much of the adult life span. Recent efforts have finally sought to explicitly treat the five factors as temperaments that are present from birth, thus placing the FFM squarely in a developmental context.

Despite all of its success, the FFM has been roundly criticized by a number of scholars. One issue raised by these scholars concerns the absence of a comprehensive theory. The lexical hypothesis, while intriguing and rational, is considered far too narrow to qualify as a theory of personality. A related issue regards the generic nature of the factors, which are considered to be too broad to provide a sufficiently rich understanding of human personality. Critics have also raised important methodological concerns, which have revolved around the use of factor analysis as the primary tool of discovery and validation for the FFM. Finally, disagreements among trait theorists have also been prominent in the literature. Some researchers have argued that three traits are sufficient: extraversion, neuroticism, and psychoticism (egocentric, cold, impulsive). Others have argued that a larger number of traits are needed to provide a comprehensive taxonomy.

The FFM will nonetheless likely continue into the foreseeable future as a popular trait model of human personality. The five factors have proved extremely useful to researchers and practitioners in a variety of areas, such as the social, clinical, and industrial-organizational domains. It has unquestionably generated a great deal of research and discussion, and it has played an important role in revitalizing the discipline of personality psychology.

—James W. Grice

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FIVE-TO-SEVEN SHIFT

When you explain to your 5-year-old nephew that his mother is your sister, he stares at you in disbelief. His 7-year-old sister, however, immediately understands that her mother could also be someone's sister. The difference between your nephew's and niece's understanding illustrates the dramatic changes in children's cognitive functioning that occur between the ages of roughly 5 and 7. Developmental psychologist Sheldon White introduced the term *five-to-seven shift* in 1965 to refer to the cognitive reorganization to which many of the changes were attributed.

White conceptualized this "shift" in terms of Jean Piaget's theory of intellectual growth, the dominant paradigm of cognitive development at the time. Piaget, a Swiss psychologist who began studying children in the 1920s, proposed that cognitive development proceeded through an invariant sequence of stages, whereby each stage incorporated or replaced the previous stage. The five-to-seven shift marked the crucial transition from what Piaget termed the "preoperational" stage, to the stage of "concrete operations."

Preoperational thinking was characterized by the child's reliance on the perceptual features of a situation. Concrete operational thought enabled the child to distinguish between the changing appearances of things and the logical or physical properties that remain constant. For example, when 5-year-olds are presented with a situation in which liquid is poured from a wide, narrow beaker into a tall, thinner one, they typically assert that there is more water in the taller beaker because the water level is higher. Seven-year-olds will recognize that the quantity of water remained the same, or was "conserved." When questioned, they will explain that no water has been added or taken away, that if the process were reversed the level of water in the first beaker would be the same, or that the second beaker is taller but narrower than the first.

Piaget's seminal contribution to our understanding of cognitive growth was his recognition that at every point of development, children's performance is an expression of some underlying cognitive structure. He hypothesized that cognitive competence was "constructed" through children's active interaction with the environment. This model of children's intellectual development provided an alternative to the long-standing philosophical and psychological traditions of nativism and environmentalism. Nativists understood intellectual growth as the unfolding of an inborn capacity for reason, as inevitable and predetermined as the child's physical maturation. Environmentalists considered the child at birth to be a blank slate, on which experience etches connections often organized by language and social practices.

Piaget assumed that children's performance on a variety of tasks and in different content areas reflected a singular underlying stage of cognitive competence, which accounted for the parallel changes in their understanding of logic and mathematics, physical properties, biological concepts, and social-psychological phenomena. However, the Piagetian assumption that one underlying structure dictated cognitive activity in different content areas, and that children could be neatly classified as being in one particular stage or another, has become controversial.

Since White originally proposed his theory of a five-to-seven shift, it has been shown that 5-year-olds

are more logical and better problem solvers than many Piagetians claimed, particularly when they are judged on their own terms and in familiar situations. Cross-cultural studies have demonstrated that competence during this period is highly dependent on the kinds of roles and responsibilities that children take on as part of a social group. Others have suggested that if anything underlies the cognitive changes that take place between the years of 5 and 7, it is children's use of language as a tool to manipulate thought. Still others point to the mediating influences of visual culture and information technology on children's development.

Furthermore, many contemporary psychologists and educators are skeptical of the unitary and context-independent aspects of Piaget's theory. It has been demonstrated that children's performance on different tasks and in different content areas is variable, which is inconsistent with the Piagetian stage model of cognitive development. Cognitive growth is currently recognized as being more continuous and incremental, more specific to context and content, and better understood in terms of functionally independent "domains," "frames," or "modules."

The changes that occur between the ages of 5 and 7 are currently understood as a shift in children's characteristic tendencies and preferences of thought, rather than a wholesale reorganization of cognitive functioning. This view reflects the compelling evidence that 5-year-olds are as capable as older children of complex reasoning and remembering, even if they fail to recognize the conditions that require those capacities. In the light of these findings, White has reformulated his understanding of the five-to-seven shift, no longer deeming 7 as the "age of reason," but rather the "age of being reasonable."

—Linda L. Louis

See also Cognitive Development

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FLAVELL, JOHN (1928–)

John Flavell is credited with introducing the work of Piaget to American psychology and founding the field of metacognition.

Flavell is a preeminent figure in modern developmental psychology. Born in Rockville, Massachusetts, he was educated at Northeastern and then earned a PhD in clinical psychology at Clark University. There, he was introduced to Heinz Werner's organismic-developmental theory, beginning a lifelong passion for the study of children's thinking. After a brief period as a clinical psychologist at a Veterans Administration hospital in Colorado, Flavell accepted a teaching position at Rochester and then moved steadily westward, initially to Minnesota, and finally to Stanford University, where he is now an Emeritus Professor.

Three of Flavell's many contributions to developmental psychology stand out. First, his brilliant treatise on the work of Jean Piaget effectively introduced Piaget, and the structuralist approach to children's thinking, to American psychology. So clear and compelling was Flavell's presentation that the Piagetian approach quickly became the dominant paradigm in cognitive development, and it remains a powerful force in that field.

Second, Flavell has written a series of seminal theoretical essays on cognitive development. These now classic essays address, for example, the validity of the "stage" construct in explaining development, the nature of developmental sequences and transitions, the methodological pitfalls associated with diagnosing cognitive competence, the relation of memory to cognitive development, and the nature of metacognition. Flavell further discussed these issues in his highly successful textbook

on cognitive development, the first on that topic to appear in North America.

Third, Flavell has carried out ground-breaking empirical research on children's metacognition (much of it in an extended collaboration with Eleanor Flavell and Frances Green). Just as it is difficult to imagine what the field of cognitive development would look like today had there never been a Piaget, so it is with metacognition and Flavell. He has pioneered research into children's knowledge about memory (which he christened "metamemory"), the development of their perspective-taking and communication skills, their knowledge about perception, their understanding of the appearance–reality distinction, their developing "theories of mind," and their understanding of thinking and consciousness. His discovery of two levels of visual perspective-taking has been especially influential. At level 1 (2 to 3 years of age), children understand that others may not see something that they do and vice versa, whereas at level 2 (4 to 5 years of age), children further recognize that two individuals viewing the very same thing may nonetheless see it differently. Similarly influential is his finding that younger children fail to recognize the distinction between appearance and reality—that, for example, an object may look like one thing but actually be something quite different. Flavell incorporated these and related findings into a persuasive "connections-representations" account of theory-of-mind development.

Flavell is a past president of the Society for Research in Child Development (SRCD). He has received numerous awards, including an American Psychological Association (APA) Distinguished Scientific Contribution Award and an APA Mentoring Award in Developmental Psychology. In addition, Flavell is one of very few developmental psychologists ever to be elected to the National Academy of Sciences. He remains a prominent contributor to the developmental literature.

—Louis J. Moses

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FLUID INTELLIGENCE

General fluid intelligence (Gf) refers to the ability to solve new problems, particularly when mentally effortful reasoning processes are required (such as inference, induction, abstraction, or synthesis). That is, Gf is involved in working out a novel solution, but not in simply remembering a previous solution. Gf is often contrasted with general crystallized intelligence (Gc), which represents culturally relevant knowledge and skills. Although Gf and Gc are distinct, Gf can support the acquisition of skills and knowledge that contribute to Gc.

Technically, Gf is a statistical construct derived from the factor analysis of mental-test scores. Factors representing the shared variance among particular tests are often interpreted as reflecting specialized latent abilities, talents, or intelligences that determine performance. Gf is typically derived from hierarchical factor analyses, in which the positive correlations among *factors* (rather than correlations among specific tests) specify common ability dimensions at a higher level, or "stratum," of generality. An overarching Gf factor emerges at the second stratum when a test battery produces several reasoning factors at the first (e.g., verbal induction, figural sequencing, and quantitative reasoning). The presence of a Gf factor indicates that people who are skilled at reasoning in one domain tend to be skilled in other domains; Gf represents the shared variance among reasoning domains.

The Gf-Gc theory of intelligence was first proposed by Cattell and elaborated by Horn. It is intermediary between views that intelligence is unitary or general (e.g., Spearman) and views that intelligence is a collection of many independent abilities (e.g., Guilford). One of the theory's primary strengths is in accounting for changes in intelligence across the life span. Whereas Gf rises until young adulthood and begins to decrease thereafter, Gc continues to rise through middle age and either levels off or drops slowly thereafter. A unitary (general) theory of intelligence cannot account for this differential developmental pattern.

The cognitive and neural mechanisms that support Gf are topics of active research. Working memory and the executive control of action are strongly linked to Gf and to the function of the lateral prefrontal cortex (PFC). The lateral PFC appears to be involved more in Gf than Gc: Patients with PFC damage often have normal IQ as assessed by Gc tests, but they show impairment on Gf

tests. Although the specific ways in which PFC and other brain regions contribute to intelligence is less well understood, neuroimaging studies indicate that PFC and parietal brain regions are activated when people perform prototypical Gf tests, including reasoning and working memory. In a study by Gray and colleagues, individuals with higher Gf were more accurate on a working memory task and had greater neural activity during the most demanding components of the task, particularly in lateral PFC and parietal cortex. Thus, working memory, executive control, and the lateral PFC appear to be important cognitive and neural contributors to Gf.

Genetic studies consistently show that general cognitive abilities are partly heritable. Although few genetic studies have examined Gf specifically, fluid intelligence is very strongly related to general intelligence and IQ. Importantly, environmental factors have a greater influence on childhood IQ in impoverished families than in families of higher socioeconomic status. That is, intelligence may be influenced by genetics only when environmental conditions are favorable. Other environmental influences include lead poisoning (negatively related) and the duration of breast-feeding (positively related). Situational factors, including anxiety, can adversely influence performance on tests, especially on tests described as assessing mental ability.

—Michael J. Kane and Jeremy R. Gray

See also Crystallized Intelligence

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FORMAL OPERATIONAL PERIOD

The formal operational period is the fourth stage of Jean Piaget's cognitive developmental theory. Formal operations incorporate, extend, and complete prior cognitive growth. Individuals begin to demonstrate formal operational characteristics between ages 11 and 15. In each stage, behavior is internalized into cognitive structures or schemes, thereby becoming repeatable and cognitively reversible. Individuals in the preceding concrete operational period use grouping structures, such as class inclusion and serial ordering, whereas formal operational individuals incorporate grouping structures with lattice structures. Lattice structures integrate many problem-related schemes to develop and use inclusional, propositional, and inferential statements about a problem's variables.

Formal operators think more abstractly, from the actual to the possible. They solve problems without using tangible, intuitive, or believable phenomena as they classify and link elements of a problem. In other words, they do not need to experience the world firsthand to generate, reflect on, and integrate information into the problem-solving scenario. This skill supports Piaget's conception of egocentricism, a decentering process that evolves from stage to stage. It also explains why adolescents are more reflective, sensitive to others, and aware of social mechanisms and how they take the emotional perspective of others and understand people's motives.

Compared with concrete operators who employ inductive reasoning, using one incident to generalize about many others, formal operators use a more rigorous and productive form of logic, hypothetico-deductive reasoning. It allows individuals to comprehend many

permutations and contradictions when developing a theory about a problem. To represent factors and factorial relationships in theory development, hypothetico-deductive reasoning employs transformations or 16 propositional statements. Transformations are dependent on the problem type and can be identified by propositional language, such as if-then and either-or.

Formal operators are also more scientific and systematic than concrete operators, who tend to be disorganized. Formal thinkers methodically vary one factor at a time and hold the other factors constant as they keep track of each test result. They use a combinatorial system that fosters perception and organization of all possible factors and incorporates them into transformations. Inefficiency and error in problem solving are thereby reduced. The ability to generate possibilities, to use hypothetico-deductive reasoning, and to be methodical when problem solving explains many of the increased cognitive achievements of adolescents and adults. Consequently, Piaget's theory has greatly influenced educational practice and perceptions of cognitive development.

However, research exploring formal operations has fostered criticism of Piaget's theory. Studies reveal that formal operational skills are not utilized by many adolescents and adults, are more often used in Western cultures than other cultures, are related to formal schooling, and can be taught to children younger than 11. Piaget briefly addressed these issues when he asserted that formal thought was not a universal achievement and that environmental as well as genetic processes were influential in cognitive development. Unfortunately, he did not explain which genetic and environmental factors have influence and how they interact to foster formal skills.

Other studies have shown that formal skills (e.g., use of transformations) are not consistently employed across problem types. Although Piaget asserted that problem type influences the transformations used, he did not match problem type with transformation type. Furthermore, Piaget and his colleague, Bärbel Inhelder, used only scientific problems when exploring and illustrating formal operations, making application of formal skills to nonscientific adolescent problems more difficult. Some, such as Lawrence Kohlberg and David Elkind, have successfully applied Piaget's theory as a foundation for exploring nonscientific problems. Kolhberg built on and revised Piaget's ideas to develop a theory of moral reasoning, and Elkind used Piaget's views as a basis for exploring his conception of adolescent egocentricism.

Additionally, Piaget's assertion that formal thinking completes the prior stages of cognitive development has been questioned. Some suggest that cognitive development continues into adulthood. However, they often use formal thinking as a basis for describing further development and posit a postformal operational stage, a problem-finding stage, dialectical thinking, or wisdom as examples of adult cognition. A theory can account for certain cognitive phenomena and lay groundwork for further research, but it can not describe all of cognitive development. Regardless of the theory's deficiencies, the formal operational period explains many aspects of adolescent cognition and has provided a strong foundation for research.

—Danae E. Roberts

See also Theories of Development

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FOSTER CARE

Foster care is defined as 24-hour substitute care for children outside of their own homes. It is generally conceived of as a time-limited living arrangement in which a child whose family is unable to maintain a sufficient child-rearing environment is placed with licensed caregivers until reunification with birth parents, adoption, or emancipation occurs. Foster care is a legally binding arrangement in which the state temporarily assumes custody of the child. Reasons for placement into foster care are diverse and include but are not limited to child abuse, neglect, parental substance dependency, mental or physical illness, and incarceration. In the past decade, there has been an increase in the number of reports of child abuse and neglect to child welfare agencies in

addition to higher numbers of mothers and pregnant women with substance abuse problems. Consequently, foster placements are involving younger children and infants more often than in the past, and these children are likely to stay in foster care longer than children placed at older ages.

The number of children in foster care has expanded in recent years, with estimates exceeding 550,000 at any given point in time. Further, it has been reported in numerous studies that these children are experiencing high levels of emotional, behavioral, and medical difficulties. Behavioral and psychological problems among foster children may persist because of caregiver instability, the effects of early maladaptive caregiving, attachment disruption, and insults to developing brain systems. In light of these alarming findings, there has been a movement toward identifying the most effective placements for children who cannot be maintained in the homes of birth parents. The promotion of the child's growth and development through a safe and nurturing atmosphere has become a primary goal of most child welfare agencies. Recent social and political trends reflect our society's efforts to create a foster care system that maximizes children's opportunity for nurturing care in the context of stability.

SOCIAL AND POLITICAL TRENDS IN FOSTER CARE

The emergence of foster care in the United States can be traced back to the efforts of Charles Loring Brace, who in 1853 founded the Children's Aid Society of New York, an organization that established modern methods in child welfare. In the late 1800s, Brace spearheaded efforts to place children from New York City with families from the Midwest and other rural locations, where they were adopted, obliged to work on farms, or both. The system improved many lives, but some of the children were exploited as free labor. Following several scandals, it became evident that more supervision was required by state agencies to ensure that children were not being mistreated. In 1909 at the White House Conference on Dependent Children, Theodore Roosevelt established the first legislation supporting the use of foster families for destitute and neglected children. This helped pave the way for a federal agency devoted to the promotion of child welfare. The Children's Bureau was started in 1912 and has remained as part of the U.S. Department of Health and Human Services, focusing on foster care, adoption, and child care standards.

Several other landmark political actions have contributed to the development of the modern foster care system. In 1935, the Social Security Act contained provisions for aid to dependent children. Funds were allocated for low-income children and children who were abused, neglected, or abandoned. It was not until 1961, however, that the federal government developed a formal method for disseminating funds for foster care. The Aid to Families with Dependent Children provided financial incentive to qualified individuals to serve as foster parents. An unintended consequence of this measure was that increasing numbers of children were removed from the homes of troubled families without first attempting any sort of intervention with these birth families. In response to the burgeoning numbers of children (nearly 500,000) in foster care and the movement toward family preservation, the Adoption Assistance and Child Welfare Act (AACWA) was implemented in 1980. This legislation provided financial incentives to encourage states to prevent unnecessary foster placements by offering preventative services and programs to reunite foster children with birth families. Initially, there was a dramatic decrease in the number of children in out-of-home placements to about 250,000 in the early 1980s. This law helped to propel the movement toward "permanency planning" by providing set time frames for placement decisions in order to reduce the number of extended foster placements.

Social and political initiatives favoring permanency planning continued throughout the 1990s. In particular, two laws were passed to reduce barriers to expeditious, long-term placements. The Multiethnic Placement Act (1994) responded to concerns about extended placements and poor outcomes for minority children in foster care. The Multiethnic Placement Act prohibited discriminatory placement practices and forbade the delay or denial of foster or adoptive placements because of race, color, or national origin. Another initiative, the Adoption and Safe Families Act (1997), continued to make placement permanency a priority by federally mandating efforts to reduce children's time spent in foster care. Child welfare agencies were commissioned to locate a permanent placement for children within the first 12 to 15 months following admission into foster care. The purpose was to reduce the number of children in long-term foster placements and to promote the adoption of

children unable to return to a safe home environment. The Adoption and Safe Families Act emphasized the safety of children first and foremost, but it also clearly established a timeline for permanency planning.

It is evident that certain aspects of the foster care system remain problematic despite the laudable efforts of our legal and social institutions. As of 2003, the U.S. Department of Health and Human Services reported that the number of children in foster care at any given time is greater than one-half million as a result of neglect, abuse, and other maladaptive parenting practices. Moreover, these children are being identified as having a range of behavioral and emotional disturbances that are more serious than in the past. It is unlikely that political initiatives will completely remedy problems associated with out-of-home placements, and it is equally clear that no simple solution exists. There will likely be continued debate regarding those conditions in which a child benefits from remaining with his or her biological family and those situations in which a child is best served by a temporary or permanent out-of-home placement. Recent initiatives that have placed a priority on children's safety and emotional security while advocating for the permanency of such placements are likely to lead to positive outcomes for many children.

TYPES OF FOSTER CARE

Foster placements differ on a number of characteristics based on the needs of the individual child and the resources available to meet those needs. Four basic types of out-of-home placement are most prominent: *family foster care*, *kinship care*, *treatment/specialized foster care*, and *group foster homes*.

Family Foster Care

Family foster care refers to continuous 24-hour childcare and supervision by a licensed or approved nonrelative caregiver. These foster parents are typically monitored by private or public child welfare agencies. Although some foster parents eventually choose to adopt, most family foster care placements are temporary. The role of nonrelative foster parents includes providing care, supervision, guidance, and a safe environment for a foster child. Even within this type of foster care, there are different kinds of arrangements. Some families serve as emergency foster families and take children into their homes on very short notice, often in the midst of a crisis. This emergency placement may last only a short period while another, more stable placement is sought. The most common form is short-term foster care in which foster parents provide a temporary home for children who are ultimately expected to return to their birth homes. Finally, there are some placements that are referred to as long-term foster care because children are not expected to return to their birth families, yet there are also no prospects for adoption. This may occur when an older child does not wish to be adopted. Long-term foster placements are not typical with very young children, especially in light of the push for permanency planning discussed in the previous section.

Kinship Care

Kinship care is another primary type of foster care in which a relative of the child (e.g., grandparent, aunt) or someone with a close emotional tie (e.g., godparent, family friend) assumes the caregiving responsibilities for a child. Kinship care is similar to family foster care in that caregivers are licensed and monitored by child welfare agencies. Children in kinship care differ from children placed in family foster care in that they are more likely to have been removed from their parents' homes because of abuse or neglect. The parents of children in kinship care are more likely to have a drug or alcohol problem and are more likely to be young and never married. Kinship care can be divided into two main categories: *formal* and *informal* kinship care. Formal kinship care refers to arrangements in which kin act as foster parents for children in state custody. Informal kinship care refers to caregiving arrangements that occur without the involvement of a child welfare agency. Kinship care has increased in recent years because it is thought to give children a better opportunity to maintain a sense of family identity, self-esteem, and continuity of family relationships. Moreover, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 changed the federal law to grant relatives priority when determining with whom foster children should live.

Therapeutic Foster Care

Therapeutic foster care refers to foster family homes that provide specific supportive services that are designed to remediate the behavioral and social problems of challenging foster children who might

otherwise be placed in residential treatment settings. Therapeutic foster parents are licensed to provide specialized services to behaviorally or seriously emotionally disturbed foster children. Therapeutic foster care combines the benefits of a family-centered environment with an array of specialized supportive services. These foster parents are part of a professional care team that provides additional clinical services to the child. Therapeutic foster parents often receive financial incentives for their services that are more substantial than the subsidies of family foster care as compensation for specialized care and training. It is often the case that these foster parents are trained by agencies that provide treatment foster care and subsequently receive contracts to care for children with support from the agency. *Specialized foster care* is similar to therapeutic foster care in that foster parents are licensed to care for foster children with a variety of unique challenges. A distinction that can be made, however, is that specialized foster care usually involves parenting of foster children with certain characteristics (i.e., children with human immunodeficiency virus [HIV] or other medical conditions, drug-addicted infants). It is often the case that specialized foster parents have specific training for dealing with the medical, psychological, or behavioral complications associated with a particular population.

Group Foster Care

Group homes and residential facilities are out-of-home placements in group settings or institutions in which multiple service providers are responsible for the supervision and treatment of foster children. Residential treatment centers or group foster homes are often utilized when severely emotionally or behaviorally disturbed children cannot be maintained in less restrictive settings. Of all foster placements, group settings tend to be reserved for the children with the highest level of problematic behaviors. In many cases, multiple failed placements occur before a child is placed in a residential setting for a long duration. Other times, a residential setting is temporary until a foster or adoptive placement can be arranged.

FOSTER CARE OUTCOMES

Research evidence about the effectiveness of the different types of foster care placement is limited. Few well-designed studies exist that compare the different types of foster care with one another as well as control for various confounding influences. Some evidence suggests that children placed in group residential care were more inattentive and hyperactive than those children in the foster family care homes, according to observational and teacher measures collected a year after placement. Other researchers have found that children raised in residential group homes experienced difficulties managing and organizing their lives as adults. Evidence consistently supports the conclusion that children who are adopted generally fare better than children in long-term foster care, who in turn fare better than children reared in group settings or institutions. However, more carefully designed longitudinal research projects need to be conducted to investigate the long-term impact of the different types of foster care on children's later social, emotional, cognitive, and behavioral development.

ENTRY INTO FOSTER CARE

A child can enter the foster care system through two main routes: voluntary or involuntary placement. Voluntary placement occurs when a biological parent or legal guardian voluntarily agrees to grant the state temporary custody of his or her child. A parent may choose to place his or her child in foster care for a variety of reasons, including lack of housing, incarceration, rehabilitation for a substance abuse problem, or poverty. The parent legally agrees to surrender custody of his or her child for a specified period of time, so that the parent can complete or achieve the stipulated activity for which he or she placed the child in foster care.

A child may also enter foster care through an involuntary placement. An involuntary placement occurs when a report of suspected child abuse or child neglect is filed against a parent or legal guardian. Once a report of child abuse or child neglect is filed with the local department of family services, a social worker must investigate the claim within 24 hours. The social worker will remove a child if evidence of abuse or neglect is found or if the environment is deemed an "imminent danger to life or health." The social worker will then remove the child from the home. The state will assume temporary custody of the child, and the child will be placed with a foster family. Preliminary hearings, fact-finding trials, dispositional hearings, and extension of placement decisions will be conducted to secure the child's safety upon return to the parent.

EXITING FOSTER CARE

Upon the parent's completion of the stipulated activity, the child exits foster care and returns to the custody of the parent. If the parent is unable to complete the stipulated activity, he or she may ask the court for an extension of time to achieve the stipulated activity. Parents may also decide to terminate their parental rights to the child, which will free the child for adoption. Parental rights must be legally terminated in court before a child can be freed for adoption. The parental rights must be terminated by both biological parents to free a child for adoption. Legal attempts must be exhausted to locate biological parents and inform them or their rights to the child before a child can be freed. If all legal avenues have been exhausted, after a specified time that may vary, the court will terminate a biological parent's rights to a child and free the child for adoption.

Social workers frequently assist parents in their efforts to complete the stipulated activity to support the return of their children. However, many social service agencies are limited in the resources and services that they can provide to families in need. Additional resources exist in some states (e.g., New York, Pennsylvania) to support parents' efforts to achieve their goals, such as Court Appointed Special Advocates (CASAs). CASAs are typically volunteers who work to ensure that a child's stay in the foster care system is as brief as possible.

Although reunification with the biological family is often the goal of foster care, it often does not ensure the future healthy development of children. Children originally placed in foster care as infants and toddlers and then reunified with their biological families are at a high risk to endure future maltreatment and physical and sexual abuse. The U.S. Department of Health and Human Services Administration for Children and Families (2002) found that 77% of children who died from abuse or neglect were younger than 4 years of age. Reunification also threatens the child's attachment relationships with his or her current foster caregivers.

FOSTER PARENT SELECTION

Individuals who are interested in becoming foster parents usually make contact with a local child welfare agency to apply or are recruited through recruiting drives by these agencies. To become a foster parent, applicants generally first have a telephone interview and then a personal interview with an agency recruiter. This is often followed by a home study to assess the current living situation, a child abuse and criminal clearance, and training sessions. However, specific requirements vary widely by state. If the state-specific requirements are met, the foster home is licensed and continually monitored by either a public or private child welfare agency.

Currently, there is a shortage of available foster parents. While the number of children in need of foster care placements has risen over the past two decades, the number of available foster families has dropped significantly. Changing family dynamics and women entering the workforce in greater numbers have had a large effect on the decline of available surrogate caregivers. In addition, a number of factors have caused increased dissatisfaction among parents providing foster care services. Because agencies are interested in keeping biological families intact, only children from the most troubled families and those children who have the most severe behavior problems are being placed into foster care. This trend, in combination with changing family dynamics, has led to fewer nonrelative caregivers willing to provide foster care.

On the other hand, there seems to be an increase in the number of kinship foster placements. More relatives of families in need are volunteering to help care for their relatives' children. Interestingly, kinship foster parents often receive fewer services and less frequent home monitoring by social workers than nonkinship parents. Kinship foster parents may be perceived as less in need of attention and assistance than nonkinship parents. However, data do not currently exist to support the claim that kinship foster parents actually require fewer services than nonkinship parents.

CHARACTERISTICS OF FOSTER PARENTS

Foster families vary widely in terms of structure, ethnicity, and socioeconomic status (SES). National information about specific characteristics of foster parents is not available because no national reporting system regarding foster parents exists. However, several recent, large-scale studies examining foster care in the United States provide some general characteristics of foster care providers. They found that most foster families (about 60%) are headed by two parents, and most others are headed by single mothers. Foster parents are generally between 35 and 55 years of age. Most foster parents have obtained a high school

degree or have attended some college. About one half of foster families would be considered of middle SES based on family income, 15% would be considered of upper-middle SES, and about 35% would be considered low-income families. Additionally, religion appears to be an important factor for many individuals who decide to become foster parents.

Individuals choose to become foster parents for a number of different reasons. Some of the most commonly given reasons for wanting to become a foster parent include the desire to help a child in need, a wish to do something for one's community or society, or an interest in having children, or more children. For most foster parents, money is not a key motivator for becoming a foster care provider. In fact, the stipends that foster parents receive often do not entirely cover the costs of raising the child, and the parents must subsidize the cost of providing care to the child.

ROLE OF FOSTER PARENTS

Foster parents are commissioned to provide a safe, nurturing home for a child who cannot be maintained in his of her home environment. This is typically a temporary arrangement, although adoption can result if the child's birth parents terminate parental rights and the foster family is inclined to adopt. The role of a foster parent can be emotionally challenging. Foster parents are often faced with dilemmas about what their role is in their foster child's upbringing. Foster parents are responsible for the child's well-being, but also need to work within the constraints of the child welfare agency charged with the child's care. Foster parents and agencies may have different views on what is in the best interest of the child. Foster parents face the prospect of assuming responsibility for a child and not always having the authority to accomplish what is necessary in a given situation. Foster parents must also deal with decisions about reunification and permanency planning, over which they have limited control. To improve recruitment, training, and retention of foster families, unambiguous and consistent guidelines for foster parents' role responsibilities should be established and clearly communicated.

EFFECTIVENESS OF FOSTER CARE

Children in foster care are presented with a unique set of obstacles to overcome as they mature. They must adjust to disruptions that they experience as they enter and exit foster care. Some children are placed with foster parents for a brief amount of time and then return home to their biological families. Other children are initially placed with foster care parents who adopt them, whereas other children experience multiple disruptions in care as they move from birth families to foster care families. These disruptions in care disturb the stability and security that caregivers provide to infants as they are shifted from one home to another. Disruptions in care and early inadequate care place the child at risk for developing future emotional, behavioral, and psychological problems. Unfortunately, many of the medical, social, emotional, and cognitive needs of children in foster care are jeopardized by the instability in care that they experience. Furthermore, it is believed that prolonged or unpredictable separations from caregivers are problematic, leading to permanent changes in biological stress systems and adverse influences on brain development. Therefore, it is important to identify children at an early age who are at risk for developing problem behaviors so that interventions can target their specific needs.

Placements into foster care, kinship care, or group foster homes have been associated with high levels of psychological and behavioral problems in comparison to children who are adopted. In response to placements with substitute caregivers, children often demonstrate developmental outcomes that are impaired across a range of social, emotional, and behavioral domains. Evidence suggests that in comparison to children exposed to similar levels of risk, children who experience out-of-home placements demonstrate significantly higher levels of behavioral difficulties associated with impulse control problems, aggression, and attentional deficits. Children experiencing disruptions in care have a higher rate of referral to mental health settings and have more severe attentional and externalizing symptoms than similar children who have not been placed with alternate caregivers.

Such sobering research evidence raises the question, How effective is foster care as an intervention? Many would argue based on research evidence previously cited that the prognosis for foster children's healthy development is grim. "Foster care drift," or the idea that many children remain in foster care even after they are eligible for adoption, is an unfortunate reality. Many policy makers and researchers argue that the foster care system is neither temporary nor effective. Alternatives to the current foster care system, such as keeping parents and children together while providing

services to the biological parents or expediting adoptions, may be more effective in the long term.

Despite the limitations of foster care as a permanent solution for children in need of out-of-home placement, there is evidence that foster care can be delivered therapeutically to enhance children's self-esteem, sense of identity, and personal worth. A number of studies have suggested that many foster parent attributes and service delivery characteristics lead to positive placement outcomes for foster children. Foster parent qualities such as warmth and acceptance, an authoritarian parenting style defined by clear structure and appropriate limit setting, and adequate social support have been associated with positive foster placements.

Studies have also found that foster parent training reduces the number of unsuccessful placements and increases retention of foster parents. Foster parent training ensures that parents possess the skills necessary to deal with children having behavioral and emotional problems. Providing foster parents the tools to handle situations effectively can reduce inappropriate responses and decrease feelings of frustration. Training to help foster parents appropriately interpret foster child behaviors, avoid stress and burnout, and cope with difficult times is important in promoting sustained placements. Respite times, ongoing responsive supervision from child welfare agencies, and social support have also been shown to enhance placement effectiveness.

In general, factors that increase foster parents' efficacy also improve their ability to provide an adequate rearing environment for their foster child. To deal with the unique challenges that foster children present, unique caregiving skills are necessary to provide optimal levels of care. Parents who are warm, are realistic in their expectations, and can manage emotionally and behaviorally demanding behaviors likely provide a foster child with the best chance for a stable and nurturing placement.

—John P. Ackerman, Sandra Sepulveda, and Melissa Manni

See also Child Custody

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FRAGILE X SYNDROME

Fragile X syndrome (FXS) is the leading cause of inherited mental retardation. It is caused by a change (mutation) in the fragile X mental retardation *1* (*FMR1*) gene located near the end of the X chromosome. This change is associated with a broad range of symptoms from speech delay and hyperactivity early in development to mild emotional problems, learning disabilities, and severe mental retardation with or without autism. The physical, behavioral, and intellectual difficulties tend to be greater in boys than in girls.

Although everyone has the *FMR1* gene, those with the mutation have an increase in the number of CGG (cytosine and guanine) repeats at the 5' end of the gene. The increase in CGG repeats is transmitted from generation to generation and is prone to expansion when passed through a female to a child. People who are carriers of fragile X have between 55 and 200 CGG repeats; this is referred to as the *premutation*. When the expansion becomes more than 200 CGG repeats, known as the *full mutation*, the individual will

have FXS. The full mutation is associated with methylation of the repeat region, which results in silencing of the *FMR1* gene and absence of the FMR1 protein (FMRP), causing FXS.

Current estimates are that 1 in 4000 males and 1 in 8000 females in the general population have the full mutation and are affected with FXS. Additionally, 1 in 250 females and 1 in 800 males are "carriers" of the FXS premutation and are typically unaffected intellectually, although they may present with clinical symptoms and carry the risk for having children or grandchildren with FXS.

Studies have documented a subgroup of children who are carriers of the gene mutation that present with mild physical features of FXS; emotional problems including anxiety, obsessional thinking, or depression; and sometimes more severe clinical involvement including mental retardation and autism spectrum disorders. A group of older premutation carriers have been identified as having fragile X–associated tremor-ataxia syndrome (FXTAS), which is characterized by progressive intention tremor, gait ataxia, parkinsonism, and autonomic dysfunction.

The classic physical features of FXS include long face; prominent ears, chin, and forehead; large head circumference; high arched palate; and large testicles (macroorchidism). In addition, loose joints, heart murmurs, low muscle tone, flat feet, and a variety of skeletal problems are often observed. Many of the physical features are associated with connective tissue problems, leading to ear infections, sinusitis, or gastric reflux.

The social and behavioral phenotype of FXS includes impulsivity, attention deficit disorders, hyperactivity, rapid speech, and hypersensitivity to a variety of sensory stimuli. As many as 25% to 30% of individuals with FXS meet the diagnostic criteria for autism and display autistic spectrum behaviors such as hand flapping, poor eye contact, and social anxiety.

At this time, there is no cure for FXS, but there are effective methods for treating many of the symptoms. A combination of special education, speech and language therapy, occupational therapy, and behavioral therapy may be helpful in addressing many of the physical, behavioral, and cognitive impacts of FXS. In addition, medical intervention can improve aggression, anxiety, and hyperactivity.

Because the impact of FXS is so varied, early diagnosis of FXS is important to ensure that both genetic counseling and appropriate treatment are attained as early as possible. Since 1991, highly accurate procedures for testing have been developed and are widely available. A blood test followed by polymerase chain reaction (PCR) and Southern blot analysis identifies the size of the repeat. This test can identify carriers and those affected and is used for prenatal diagnosis.

—Faraz Farzin, Louise Gane, and Randi Hagerman

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FRAMINGHAM STUDY

The Framingham Heart Study pioneered the identification of "risk factors" for heart disease, and this ongoing and ambitious study continues to contribute to the understanding of heart disease and other cardiovascular and related illnesses. Of primary significance to psychology is that findings from this study identify psychosocial risk factors for heart disease and highlight the importance of positive lifestyle change in the prevention and treatment of cardiovascular illnesses.

WHAT LED TO THIS INVESTIGATION?

A major health shift occurred in the beginning of the 20th century, as cardiovascular disease became (and continues to be) the leading cause of death and illness in the United States. Little was understood about this foremost killer at the time, necessitating the formation of research to examine contributing factors to heart disease. The Framingham Heart Study was a response to this need and was originally designed to investigate the factors that predispose to cardiovascular diseases such as heart disease and stroke.

THE STUDY: THREE GENERATIONS AND GOING STRONG

The Framingham Heart Study is a longitudinal study that has tapped into three generations of residents

from the town of Framingham, Massachusetts, and has evolved in measurement and primary focus. In the first phase of the study, researchers collected extensive physical and lifestyle data on 5,209 primarily white adult men and women from Framingham, Massachusetts, with follow-up physical examinations every 2 years. Extensive psychosocial measures such as personality, anger, and stress were obtained between 1965 and 1967. During the first 30 years of the study, researchers assessed the relationship of clinical observations with the development of cardiovascular disease and through this process found that factors such as cigarette smoking, cholesterol levels, and psychosocial factors were related to heart disease.

The 1970s marked two important advances in the study: (1) the recruitment of offspring, and (2) new diagnostic technologies. A second generation of subjects was recruited beginning in 1971, with 5,124 adult children (of the original sample) and their spouses participating in the study. The physical examinations conducted were similar to earlier examinations; however, technological advances such as echocardiography and carotid artery ultrasound allowed for more refined observations of the heart.

Currently, the study is in its third phase with the recruitment of children from the offspring cohort. The primary focus of investigation in this phase of the study is the role of genetic factors in cardiovascular disease. In addition, the Omni Study of minorities was launched in 1995 to investigate similarities and differences among minorities from the primarily white cohorts in the Framingham Heart Study.

WHAT ARE THE RISK FACTORS?

Major risk factors for coronary heart disease identified by the Framingham Heart Study include high blood pressure, high blood cholesterol, smoking, obesity, diabetes, and physical inactivity. Other, related risk factors include blood triglyceride and HDL cholesterol levels, age, sex, and psychosocial issues. Most of the risk factors identified by the Framingham Heart Study can be modified by positive lifestyle change, highlighting the importance of psychology in the prevention and treatment of cardiovascular illness. In addition, psychosocial variables such as type A behavior and suppressed hostility (not discussing or displaying anger) have been identified as independent risk factors for coronary heart disease in both men and women.

CONCLUSION

Whereas the Framingham Heart Study is best known for its contributions to the understanding, prevention, and treatment of cardiovascular disease, data from this study also have been used to understand diseases such as osteoporosis and arthritis, diabetes, kidney disease, cancer, eye disease, hearing disorders, dementia, and lung diseases. More than 1,200 articles have been published in reputable journals, with more to come as the Framingham Study continues to contribute to our understanding of cardiovascular disease and the importance of lifestyle and psychosocial factors in health.

—Lori J. Lange

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FRATERNAL TWINS

When two fetuses are carried simultaneously and delivered by a woman, it is termed a *twin birth*. Most multiple births are twins. In 1997, 94% of multiple births reported were twins. The numbers of twin, triplet, and higher-order multiple births have climbed at an

unprecedented rate during the past 20 years. Between 1980 and 1997, the number of live births in twin deliveries rose 52%. By contrast, singleton births, or one baby delivered alone, rose only 6% during this time.

Twins referred to as *fraternal* or *nonidentical* (also known as *dizygotic* or *binovular*) are much more common than *paternal* or *identical* twins. They are derived from the development of two eggs that are released from separate follicles at about the same time. They are fertilized by different sperm and become implanted in different places in the uterus. Only rarely do they share the same placenta, and this occurrence is thought to be possibly caused by the use of in vitro fertilization. The embryos have different chromosomal makeups and may or may not be the same gender. They may be as similar or different in characteristics as siblings born at separate times.

The incidence of multiple births in white women has increased more rapidly than among African American women. Because of this, the historical differences in the rates of multiple births between them have been largely erased. For 1997, the twin birth rate for Hispanic women (19.5 per 1,000 births) was substantially less than for non-Hispanic white or African American women (28.8 and 30.0, respectively). The Asian countries of Japan and China have the lowest twinning rates, estimated at 1 in 150 and 1 in 300, respectively.

There are numerous explanations for the increase in twin births. There has been a growing trend for women to begin their childbearing at a later age and to continue to reproduce into later years. The likelihood of multiple births increases steadily with advancing maternal age. A woman in her 30s has twice the chance of giving birth to fraternal twins as her counterpart 10 years younger. Seventeen percent of mothers older than 45 give birth to twins. Of women older than 50, nearly one in nine gives birth to twins. For mothers who have already had one set of fraternal twins, the chances of conceiving another set are four times greater than the average woman, or about 1 in 12. Improvements in the early detection of twin gestations through the use of ultrasound technique, improved prenatal care, and medical advances in the care of neonates have increased the survival rate of twins. Advances in infertility treatments have also contributed significantly to the increase.

All multiple pregnancies are automatically considered high risk. Twins are eight times more likely than singletons to be born at a weight of less than 1,500 grams, or very low birthweight (VLBW). More than one half of all twins are born with low birth weight (LBW; less than 2,500 grams). This compares with only 6% of singletons born with LBW. Additional risks for these infants include prematurity; underdeveloped lungs, which can lead to respiratory distress syndrome (RDS); cerebral palsy; hearing or vision problems; and developmental delays or learning disabilities. Risks for the mother include preeclampsia (a rapid rise in blood pressure, protein in urine, and fluid retention), anemia (low red blood count), preterm bleeding, preterm labor, gestational diabetes, blood clots, and miscarriage. There are thought to be many more twin conceptions than births because often one or both fetuses are lost during the first trimester owing to miscarriage or vanishing twin syndrome.

As would be expected, families of twins face increases in financial burdens, marital stress, child care issues, and a multitude of other adjustments. With the ever-growing incidence of twins, more and more families are affected.

—Mary P. Gass

See also Twins

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FREUD, SIGMUND (1856–1939)

Sigmund Freud is arguably the most influential psychologist in history. Born in Freiberg, Moravia (now Pribor, Czech Republic), lived in Vienna, Austria from

about age 5 until his forced exile to London in 1938. Completing his medical degree in 1881, Freud's early interest was in neurology; he studied hypnosis as a treatment for neurosis under Charcot in Paris. Returning to Vienna, he married Martha Bernays, with whom he had six children, and began private practice.

Throughout his career, Freud developed many collaborations, although most of them dissolved acrimoniously. His first, and perhaps most influential, was with Josef Breuer, a Viennese physician treating "Anna O," a young woman suffering numerous hysterical symptoms. From this collaboration, Freud theorized that hysteria stems from conflict in the unconscious and that bringing this material into consciousness allows resolution and relief of hysterical symptoms. Initially using hypnosis to access the unconscious, Freud finally settled on various talking methodologies, including free association, speaking whatever comes to mind with no editing, and dream analysis.

Freud developed the theory of psychosexual development of a three-structured personality (i.e., the id, ego, and superego) that develops as it moves through three conflicts between infantile sexuality and a repressive society (the oral, anal, and phallic stages). Following these three stages, much of this material is repressed, buried in the unconscious; during this latent stage, identification with the same sex parent and socialization into the expected roles of men and women can occur. Around puberty, the fully developed, sexual, adult personality emerges in the genital stage. Although later personality theories have abandoned many of the sexuality factors, most contain elements of the Freudian conceptualization of the id, ego, and superego.

Freud's major contributions to psychology can be summarized as follows:

1. Freud provided the first, formally organized theory of personality development; its controversial nature stimulated the development of alternatives fostering growth in the field of personality development.
2. Although not unique, Freud's insistence that childhood was psychologically unique from adulthood is, today, a cornerstone of developmental theory.
3. Believing personality development largely complete by age 6, Freud was instrumental in showing that events of childhood influence who we are as adults.
4. Freud maintained we have strong feelings for our parents, and these feelings influence how we develop; unobscured by Oedipal fantasies, this notion is seen in much of the work on attachment and parenting today.
5. Freud's ego defense mechanisms, which explain behavior as biologically motivated and often unavailable to conscious awareness, rather than rational and conscious, remain useful in clinical practice today.

—Melinda C. R. Burgess

See also Psychoanalytic Theory

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FRIENDSHIP

DEFINING FRIENDSHIP

In all cultures, friendships are important relationships throughout the life span. What exactly is friendship? Although there are multiple types of friends, including neighborhood friends, same-sex friends, other-sex friends, and best friends, friendship is generally characterized by five defining features. First, friendship is a dyadic relationship, meaning that it involves a series of interactions between two individuals known to each other. Second, most experts contend that friendship involves a reciprocated, affective, or emotional bond. In other words, friendships are recognized by both members of the relationship and are characterized by a bond or tie of reciprocated affection. Third, these relationships are voluntary. Friendship is not obligatory; two individuals choose to form a friendship with each other. In Western societies, friendships are one of the least prescribed close relationships, with no formal duties or legal obligations to one another. Fourth, friendships are typically egalitarian in nature. Unlike parent-child relationships, for instance, each individual in a friendship has about the same amount of power or authority in the relationship. Fifth, almost all friendships are characterized by companionship and entail engaging together in shared activities. In fact, one of the primary

goals and motivations of friendship is companionship. In addition, adolescent and adult friendships often meet other socioemotional functions, such as serving as sources of support and providing opportunities for self-disclosure and intimacy.

These features differentiate friendship from several related phenomena. The fact that friendships are dyadic relationships distinguishes them from cliques or groups of peers. Of course, many members of cliques are also friends with other members. However, a friendship between two people is not the same as a group of peers. Similarly, having friendships is different from being popular or having a high social status. Individuals who are not popular certainly may have close friendships. Less commonly, a popular person may not have a real friendship. The affective bond that is a component of friendship distinguishes friendship from acquaintanceship. Friends provide individuals with more opportunities for self-disclosure and emotional support than acquaintances. The reciprocal nature of friendship also differentiates actual friendships from relationships in which one person thinks or wishes it were a friendship.

FRIENDSHIP IN DIFFERENT PHASES OF THE LIFE SPAN

Friendships play an important role in healthy human development and adjustment across the life span. Friendships exist in practically every stage of development, although the form they take varies considerably with age.

Early Childhood

Although there is no clear consensus regarding at what age children first begin to form friendships, the foundations of such friendships begin to emerge quite early. Toddlers behave in regular, predictable manners in their interactions with well-acquainted peers earlier than they do with unacquainted peers. Within the first 2 years of life, children show stable preferences for certain peers over others; further, they follow different interaction patterns with these preferred playmates than with other familiar peers. By the time children reach preschool age, the existence of true friendships is even more evident.

Children themselves tend to first define friendships in terms of interactions, such as "we play together." Companionship is generally viewed as the primary function of friendship among toddlers and preschoolers. Preschool friends have more social contact with each other, talk more, and demonstrate more equality and less dominance in their interactions than they do in their interactions with nonfriends. Differences between friends and nonfriends are particularly evident in social pretend play. By preschool, children also begin to incorporate more emotional and affective functions into their friendships. Preschool friends express more positive affect toward each other and score higher on measures of mutual liking, closeness, and loyalty than nonfriends do. Additionally, even young children frequently become sad or lonely when a friend moves away.

Friendships are not always harmonious, however, and young children may engage in conflict with their friends. In fact, early childhood friend dyads tend to engage in more conflict than nonfriend dyads. Yet, friend dyads also extend more efforts to resolve conflict and are more successful at such resolution than are nonfriend dyads. Conflict resolution is frequently seen as one of the important social skills that young children develop within their earliest friendships.

Additionally, friendships are not always mutual among young children. Although the definition of friendship typically requires reciprocity, unilateral friendships in which only one child of a pair nominates the other as a friend are quite common in early childhood. In fact, about 50% of nominated preschool friendships are unilateral.

Middle Childhood

Friendships make up an important aspect of development in middle childhood, when much time is devoted to social play and social interaction skills are becoming increasingly important. School-age children spend a great deal of time interacting with peers and thus are presented with many opportunities for extending the friendship skills they acquired in early childhood. Children tend to form friendships with individuals who are similar to themselves on a variety of dimensions. Some research suggests that there is greater similarity between friends on characteristics that are high in reputational salience. For example, school-age boys tend to be especially similar to their friends on aggressiveness. Children at this age are developing increasing independence from their parents, and their relationships with friends may be somewhat less dependent on parental involvement

than was the case in preschool. Children may have more time with their friends outside the direct supervision of an adult. Coupled with the sociocognitive advances of middle childhood, spending time together with a friend may promote the development of shared intimacy, which frequently takes the form of shared secrets, and becomes a defining feature of friendship for children at this age.

School-age friendships are differentiated from early childhood friendships in a number of additional ways. Friendships in middle childhood are more stable over time than friendships in early childhood, yet still typically less so than adolescent or adult friendships. In addition, a much higher proportion of friendship nominations is reciprocated in middle childhood than in early childhood. Although same-sex (versus other-sex) friendships compose the significant majority of friendships in early and middle childhood, there is a sharp decline in the proportion of other-sex friendships in middle childhood. A high proportion of same-sex friendships remains until adolescence.

As in early childhood, school-age friendships are characterized by social contact, talking, equality, positive affect, mutual liking, closeness, and loyalty. In addition, emotion is expressed more readily with friends than with nonfriends by this age; affective reciprocity, emotional intensity, and demonstrations of emotional understanding are all more common. As in preschool, friendships in middle childhood are defined in large part by shared activities, yet in middle childhood, the concept of a friendship as transcending shared activities and having continuity over time emerges more fully. By middle childhood, friendships are frequently more complex and more similar to adult friendships than are children's earliest friendships. Loyalty, shared values, and shared rules become important during the school years, and shared interests, empathy, common understanding, and self-disclosure gain increasing importance by preadolescence. Friends also communicate differently than nonfriends. Conflict remains more common among friends than among nonfriends, as does its resolution.

Friendships still tend to be relatively immature in comparison to adolescent and adult friendships, however. Children at this age are better able to take the perspective of another person, but they are still primarily focused on what they need or want out of the relationship, rather than what their friend may need or want.

Adolescence

Adolescence marks a critical period in the development of friendships. A variety of factors, such as growth in cognitive capabilities and strivings for increased autonomy from parents, contribute to the formation of close friendships in adolescence. Close friendships involve more affection and intimacy than friendships before adolescence. Although relationships to parents remain important sources of support, adolescents begin to seek more support and advice from friends than in early or middle childhood. Adolescents also spend more time with friends than in earlier ages.

Although adolescents may have some close friends whom they spend a lot of time with and do many different things with, they also begin to develop many friendships that are more specialized in nature. That is, they may have a friend whom they engage in particular sports with, and another friend who is involved in the same school club or activity they are involved in. Neighborhood and school friends can also be relatively distinct groups of peers.

Adolescent friendship is also distinguished from friendships in childhood by the establishment of friendships with other-sex peers. In early and middle childhood, the vast majority of friendships are formed between same-sex peers, and many children do not have any other-sex friends. In adolescence, most friendships are still with same-sex peers, but most adolescents have one or more other-sex friendships as well. Such friendships serve many of the same functions as same-sex friendships, but they also may be differentiated from same-sex friendships on some dimensions. For instance, opposite-sex friendships provide opportunities for learning about the other sex and obtaining the perspective of the other sex. These friendships may also contain some element of sexual tension. Other-sex friends also tend to have less in common with each other, engage in less self-disclosure, and are less stable than same-sex friendships.

Some individuals form friendships with other-sex individuals whom they were initially attracted to, but eventually decided to be "just friends." At the same time, some other-sex friendships evolve into romantic relationships. Even more commonly, these friendships can provide opportunities for heterosexual youth to find romantic partners because an other-sex friend may introduce them to someone who becomes a boyfriend or girlfriend. Although we know far less about the links between friendship and the development

of romantic relationships for homosexual adolescents, some research suggests that for both homosexual and heterosexual youths, other-sex and same-sex friendships may serve as a learning ground for developing the intimacy and connectedness that are part of most adult romantic relationships.

"Friends-with-benefits" is another type of adolescent friendship that seems to be relatively new and relatively specific to Western industrialized cultures. Friends-with-benefits are friendships that involve some degree of physical or sexual intimacy, but are not considered to be a romantic relationship by both parties. Although research is underway on this topic, we currently have very limited knowledge about this specific type of friendship. One possibility is that friends-with-benefits function to meet the physical and sexual desires that develop with puberty and may operate as a basis for some teenagers to learn about sexual experiences.

Adolescence is also marked by the emergence of romantic relationships. In many respects, these relationships can be considered a particular form of friendship. In fact, adolescents and adults often perceive their romantic partner to be their best friend. Just like other types of friendships, romantic relationships are characterized by affiliation and companionship. In late adolescence or adulthood, these relationships may become more distinct from friendships, but even then, companionship and affiliation remain important elements of these relationships.

Adulthood

Because adulthood encompasses a wide range of ages and life stages, the individual's stage in the life course is an important factor in considering adult friendships. Life course changes such as the transition to marriage, the transition to parenthood, and the process of retirement affect friendship patterns.

Research on friendship in young adulthood has mostly focused on college students. We actually know little about the friendships of individuals who marry or join the workforce directly after high school. Because of the nature of their environment, college students are likely to have a greater number of friendships than individuals who are not students. College students are surrounded by peers, and at least traditional full-time students have the time and opportunity to develop close friendships. Regardless of whether they are in school or the workplace, young adults who are more involved in a romantic relationship have fewer friends than individuals who are single.

This trend continues into middle adulthood. In particular, when individuals enter into marriage, both men and women seem to withdraw from friendships. Middle adults generally have fewer friends than college students. In comparison to friendships of younger adults, friendships in middle adulthood also tend to be more homogenous in terms of factors such as age, race, and social status. Adults also tend to have mostly same-sex friendships and thus have fewer other-sex friends than do adolescents. This trend may in part occur because social norms portray other-sex relationships as a threat to marital relationships. The decrease in frequency of friendships and the increase in homogeneity of friends during this period may also reflect the environments of most adults in middle adulthood, with fewer numbers of peers and potential friends. In addition, adults' lives are typically more multifaceted and more complex, often occupied by family, parenting, and careers.

Friendships among older adults take place in different contexts than friendships in middle and young adulthood. This age and life stage is often characterized by events such as retirement, relocation, widowhood, and deteriorating health. These transitions produce some increases and some decreases in older adults' ease and ability of forming and maintaining friendships. For example, retirement eliminates work as a source of interacting with possible friends. Widowhood, on the other hand, may encourage individuals to look to friends more often for sources of support and companionship.

PHASES OF FRIENDSHIP: FORMATION, MAINTENANCE, AND DISSOLUTION

Across individuals of all ages, friendships form, evolve, and sometimes dissolve over time. The length and duration of the various phases of a friendship vary across individuals and across different circumstances.

The formation phase of a friendship is the transition from strangers to acquaintances to friends. During this phase, individuals engage in interactions to get to know each other and to forge the affective bond that characterizes a friendship. Both youth and adults have a tendency to form friendships with others who are similar to them. Even young children are attracted to peers of the same age and sex. Similarity in terms of behavioral characteristics and activity

preferences become increasingly important by middle childhood. As people enter adolescence and adulthood, similarity in terms of attitudes, values, and beliefs, as well as shared interests and activities, may be bases for forming friendships. Adults are even more likely than youths to form friendships with individuals who are similar to themselves in terms of variables such as gender, age, race, and social status.

Why does similarity play a role in the formation of friendships? Environmental variables are one explanation for why individuals tend to form friendships with people who are similar to them. Children and adults frequently spend time with others who are similar to them, and thus have more opportunities to form friendships with similar people. For instance, among children and adults, those who reside in the same neighborhoods are typically similar in terms of socioeconomic status or ethnicity. Peers that children meet at school are likely to have a similar educational status, achievement level, and educational goals, especially as they grow older and are assigned or select classes on the basis of their academic success. Similarly, adults frequently meet and form friendships with colleagues at work who are likely to have similar educational attainment and socioeconomic status. Friends that develop among both children and adults through social clubs or groups commonly share at least one activity or value in common, such as an interest in a particular activity or a political view. Individual characteristics also play a role in explaining why people frequently choose to form and maintain friendships with people who are similar to them. Individuals may find interactions easier with others who are similar in personality, behaviors, values, and attitudes, thus facilitating further interactions and the subsequent development and maintenance of a friendship. Thus, there is strong evidence for the adage that birds of a feather flock together, and little evidence that opposites attract.

The maintenance phase of friendship involves engaging in interactions that serve to sustain the relationship. Friends engage in a variety of behaviors to maintain their relationship, such as sharing interests, doing recreational or leisure activities together, and exchanging support and advice. Friends typically have conversations about topics such as family issues, dealing with other interpersonal relationships, and daily activities. The frequency of interactions between friends is one central determinant of the success of maintaining a friendship. In other words, friendships are not stationary; interactions are required to maintain a friendship. Convenience is perhaps the most important determinant of the frequency of interactions between friends. Thus, it is easier to maintain friendships with individuals in close proximity (e.g., neighbors) than with those far away (e.g., long-distance friends).

One of the most notable distinctions between a developing friendship and a close friendship is the mutual affective bond. As individuals transition into becoming closer friends, what started out as a mutual liking of each other typically evolves into a stronger emphasis on reciprocal self-disclosure, intimacy, and emotional support. How satisfied a person is with the support and companionship they derive from a friend is an important factor in determining an individual's investment and the amount of effort they put into maintaining a friendship. Interestingly, once a certain degree of an emotional bond has been established, it is more the quality than the quantity of interactions that determine the successful or unsuccessful maintenance of a friendship. In other words, friends who have a long-standing history and who have established a strong affective connection may not need to interact very frequently to maintain their friendship.

Whereas joint satisfaction in the relationship is a part of maintaining friendship, another important component of friendship is managing and resolving conflict. Although the amount and intensity of conflict varies across individual friendships, conflicts do arise in most friendships. In general, conflict is infrequent in the early stages of forming a friendship, but actually tends to increase as individuals become closer friends over time. Some evidence suggests that conflict can potentially serve to strengthen the emotional tie between friends. Because conflict involves self-disclosure and exposing one's own vulnerabilities, successful negotiation of disagreements that arise between friends can actually foster increased trust between friends.

Whereas some friendships will be maintained indefinitely or forever, other friendships will dissolve or break up. Friendships dissolve for multiple reasons and under multiple circumstances. Sometimes the reason can be attributed to circumstances; a friend may move away, and contact becomes harder to maintain. Sometimes friendships may end abruptly. For instance, friends may have a major disagreement that is not resolved. Friendships may also end gradually. In some circumstances, friends share less in common over time or feel less supported by each other.

FRIENDSHIP AND SOCIOEMOTIONAL ADJUSTMENT

Empirical research has repeatedly found links between friendships and healthy adjustment. It is true both that friendships promote adjustment and that well-adjusted individuals are more likely to develop friendships. First, friendships have an important effect on individuals' socioemotional adjustment throughout the life span. Perhaps foremost, friends serve as a critical source of social support. In childhood, adolescence, and adulthood, social support from friends has significant, positive effects on well-being, such as increasing one's life satisfaction and happiness, augmenting a person's ability to successfully cope with life stress, and even decreasing an individual's vulnerability to illness. Well-being is enhanced by both having friendships and being accepted (vs. rejected) by one's peers. Regardless of social status (i.e., being popular or unpopular), it seems particularly important for healthy adjustment that a person has at least one friendship. Individuals without any friends, particularly individuals who are rejected or bullied by their peers, are at significant risk for a variety of socioemotional difficulties, such as loneliness, depression, and anxiety. Friends can protect each other and provide support for each other against victimization from other peers.

Along these lines, friendship in childhood and adolescence plays a central role in developing an individual's sense of self-worth. Because friends disclose and share personal thoughts and feelings with each other, friendships are an opportunity to receive and provide validation of one's self-worth. Children and teenagers who have friendships have better self-worth or self-esteem than youths who do not have friendships.

Friendship also plays a pivotal role in the socialization of children and teenagers. Although parents clearly are important figures in socialization as well, children and adolescents learn important and valuable information about appropriate behaviors and social norms from peers. Children, and particularly adolescents, have their own cultural norms, most notably with regard to fashion and entertainment. Children and adolescents observe the dress and behaviors of their friends and either strive to be similar or are pressured to conform. In addition to such lifestyle choices, children and adolescents' opinions and attitudes are frequently shaped by those held by their friends. Friendships offer an outlet for discussion and observation of beliefs and attitudes about such topics as the importance of school, plans for the future, values, activity preferences, and risk-taking behavior. Children can thus learn from their friends what types of beliefs and behaviors are acceptable within a given social context.

Similarly, friendships are children's first experience of egalitarian relationships. In family relationships, parents ultimately have more authority. With friends, however, decision making and power are expected to be more evenly distributed. In effect, these egalitarian relationships provide the necessary opportunities for learning the give-and-take required for effective social interactions. Such experiences teach children how to have mutually rewarding experiences, how to share, and how to resolve conflicts. As emotional intimacy and self-disclosure between friends become more important in adolescence, youth learn about obtaining support from friends, and they also learn how to provide comfort and serve as a source of support for friends.

Although friendships are typically thought to have a positive influence on socioemotional adjustment, it is not just having or not having friends that plays a part in individuals' well-being. The specific effects of friendship on adjustment vary as a function of who the friend is. Thus, having a friend who is deviant or antisocial is likely to foster deviant or antisocial behavior. For example, one important determinant of an adolescent's use of alcohol and drugs is his or her close friends' substance use. Adolescents who have close friends who use alcohol or drugs are more likely to use such substances themselves. In part, this occurs because friendships involve mutual socialization, meaning that friends become more similar to one another over time, perhaps by actively seeking to emulate qualities in their friends, or by trying to strengthen the friendship by emphasizing similarities. Additionally, it is equally true that individuals select friends who are similar to them. In other words, individuals who use drugs are likely to seek out other peers who use drugs.

It is important to point out that just as friendships appear to promote better adjustment, it is also true that well-adjusted individuals are more likely to develop friendships. For instance, children and adolescents who have a secure attachment to their parents are more likely to form friendships and to have more supportive friendships. Similarly, those who are accepted by their peers are more likely to develop friendships.

GENDER DIFFERENCES IN FRIENDSHIP

Research suggests that there are gender differences in the nature of friendships. Males and females generally stress different factors as being important in friendship. Males often emphasize the importance of doing things together, such as joint activities and shared interests. Women often emphasize the importance of shared intimacy and emotional connectedness in friendships. Such differences begin to appear in children's friendships and may be greater as they grow older.

Why are there differences between the characteristics of males and females? One explanation is that social norms define different expectations for friendships according to gender. Females may be socialized to share feelings and be more emotionally intimate in friendships; thus, they may value and establish these characteristics in friendships. Males may be socialized to be less emotionally expressive; thus, they may value the companionship of friendships more than the intimacy of friendships. Alternatively, other perspectives on gender and friendship contend that gender differences in friendship characteristics are overstated. For example, it has been suggested that males may develop intimacy and connectedness through alternative means, such as activities or shared experiences. From this perspective, gender differences may really be less meaningful than individual differences in factors such as emotional expressiveness and communication skills.

CONCLUSION

Friendships can be defined in terms of five defining features of friendship—their dyadic nature, an emotional bond, voluntary status, egalitarian structure, and provision of companionship. These features are common across ages and gender, although the form that friendship takes changes considerably over the course of the life span. Regardless of the stage of the life span, friendships play an important role in many aspects of our lives.

—Lauren Berger, Lisa Hohmann, and Wyndol Furman

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FUNERALS

Funerals are the most commonly recognized bereavement ritual linked to death loss. Bereavement rituals can prove helpful for individuals by offering a way to acknowledge the death, remember the deceased, or understand and openly express feelings. These rituals afford the opportunity to say goodbye and form a new relationship with the deceased.

Despite the many therapeutic aspects of bereavement rituals, some have recently argued that rituals have deteriorated in meaning, leading to inadequate grieving and insufficient grief resolution. Although rituals can initiate the grief process, they are not miraculous. Their positive impact comes from individuals' ability to make meaning of these experiences.

Many grief researchers believe that funerals can be the most therapeutic ritual in managing grief adjustment if adequately planned and properly conducted. Irion's multidimensional description of the funeral is the first and most extensive examination of funeral theory. He described funerals as consisting of four dimensions: cultural anthropological, social psychological, psychological, and theological.

The cultural anthropological dimension provides more of a historical, intangible perspective of the funeral. Anthropologists found that individuals attempted to shield themselves from death by controlling it through burial rituals. They appeared capable of body disposal and reorienting bereaved individuals, seemed to preserve and request certain values to be present during the funeral, likely experienced continued connection with the dead after attending funerals over time, and processed through three distinct phases, including separation, transition, and incorporation. The social psychological dimension focuses on the value of the funeral for individuals in the context of their societal group. From this perspective, the funeral involves a relational transition between the mourner and the

deceased, during which the mourners undergo a period of isolation and, subsequently, final reunion with others. Unlike the social psychological dimension that focuses on mourners in the context of their social group, the psychological dimension concerns the needs of the individual. The funeral is psychologically necessary because it provides the opportunity for grief work needed to maintain emotional health and assists mourners by confronting them with the reality of the death to help them understand their various emotional responses. The theological dimension serves as an act of benediction by affirming the ending of an individual's life while also emphasizing the love and respect for this individual. Although Irion concluded that the effectiveness of the funeral increases in direct proportion to the number of dimensions it contains, he explained that funerals containing fewer than all four of the dimensions can still be helpful.

Most of the research conducted on funerals has evaluated attitudes and participation of adults, children, and adolescents. Results suggested that adults value aspects of the funeral reflecting all four of Irion's dimensions. Adults also attributed greater meaning to funerals when deaths were expected. Greater funeral participation by adults was shown to be related to greater closeness to the deceased and fewer negative symptoms.

In comparison, children and adolescents valued aspects of the funeral reflecting the social psychological and psychological dimensions. Regarding participation, children who attended funerals of unexpected deaths demonstrated more internalizing-externalizing behaviors. Results also suggested that children and adolescents experience lower overall negative symptomatology as a function of their funeral attendance.

—Laura L. Mathews

See also Death

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G

Grandparents

If nothing is going well, call your grandmother.

—Italian Proverb

GAMETE

A gamete is a cell containing half the amount of genetic material found in a somatic (body) cell that is capable of joining with another gamete and developing into a new individual. In this sense, the joined gametes (zygote) form the earliest stem cell since this one cell will go on to form a completely new organism.

In humans, there are two types of gametes: the sperm and the ovum (egg). After puberty, men can make more than 1 million sperm per day. On the other hand, women release one mature egg about every 28 days. When a sperm penetrates an egg, a zygote is formed. Very shortly following conception, the genetic material from the sperm joins that of the egg to make a cell that contains the correct amount of genetic material, 46 chromosomes, to make a whole new individual.

Each gamete carries one copy of each of the chromosomes. Thus, the process of fertilization is how each new offspring gets one copy of each chromosome from its father and the other half from its mother. Because each parent has two copies of each chromosome, they pass only one of them to each of their offspring, but they do so randomly, allowing for great genetic diversity. Additionally, there are mechanisms in place to ensure that only one sperm and one egg are allowed to come together during conception. This is important because only the correct amount of genetic material will allow for proper development of the fetus.

If a gamete contains more or less of the number of chromosomes than it should, two outcomes are possible. First, it is likely that the embryo will be spontaneously aborted early in the pregnancy owing to the malformation of the embryo. Alternatively, in some cases, the baby is born with a medical syndrome. The most common chromosomally caused syndromes are Down syndrome (having an extra chromosome number 21), Turner's syndrome (having only one sex chromosome, an X), and Klinefelter's syndrome (having more than two sex chromosomes).

There are many other genetic alterations that can be present in the gamete that are harder to detect because they involve small variations in the DNA sequences of the chromosomes. Whether an offspring will develop a particular trait or disease depends on whether the trait is dominant or recessive and if only one or both gametes bring the allele for the trait. When one considers that there are more than 30,000 genes in the human genome, and that there are multiple variations of each gene, it is easy to see why each person is unique.

—Therese Poole

See also Pregnancy

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GANGS

The past 15 years have witnessed a dramatic resurgence in youth gang activity in the United States. One of several types of gangs (others include prison gangs, motorcycle gangs, hate groups, ideological gangs, and adult street gangs), youth gangs are not new to the American landscape. Modern youth gangs, however, are more dangerous than their historical counterparts because of the growing drug economy, the decreasing availability of legitimate employment opportunities in urban areas, increased mobility due to the availability of automobiles, and greater access to more lethal weapons. Moreover, gangs are no longer limited to densely populated urban areas but have an increasing presence in suburbs, small cities, and rural towns.

WHAT IS A GANG?

There is a great deal of heterogeneity within youth gangs and consequently considerable disagreement over how to define them. Some gangs are loosely knit groups of youth with no specific function, whereas others are highly structured criminal organizations with identifiable leadership. In some regions, gangs are organized around specific geographic locations or turf; in others, however, they are not. There have been several attempts to develop a definition that is broad enough to encompass the varying manifestations of gangs while at the same time specific enough to exclude other youthful groups that may occasionally engage in deviant activities (e.g., fraternities). A commonly used definition identifies youth gangs as groups that (1) consist of more than two individuals within a limited age range (typically 12 to 24); (2) share a sense of identity as evidenced by the use of a collective name, colors or symbols, specific clothing styles, or hand signs; (3) show some sign of permanence, lasting for a year or more; and (4) are involved in criminal activity.

HISTORY OF GANGS IN THE UNITED STATES

The earliest youth gangs may have originated in Europe or Mexico. Although no one is certain when these groups began to emerge in the United States, there are accounts of youth gangs in this country as early as 1783. The first gangs appeared in large cities such as New York, Boston, and Philadelphia, followed by appearances in Chicago and, more recently, Los Angeles. The first modern criminal gang was the Forty Thieves gang that formed in the Five Points district of New York City in 1820; although primarily an adult gang, it later gave rise to a juvenile group called the Forty Little Thieves. Social scientific study of youth gangs began in the early 20th century and suggested that the earliest youth gangs may have spontaneously evolved from neighborhood play groups as a result of changing social conditions, particularly increasing urbanization, industrialization, and immigration. During the past two centuries there have been four distinct periods of intense gang proliferation and activity in the United States, each of which is also characterized by rapid immigration and population shifts, social and political unrest, and industrial and technological change: the late 1800s, the 1920s, the 1960s, and the 1990s.

PREVALENCE OF GANGS

The most widely used estimate of the prevalence of gangs is the National Youth Gang Center's annual survey of law enforcement agencies nationwide. In 2002, there were about 21,500 youth gangs in the United States with 731,500 members. The actual prevalence of gangs may be higher because these estimates represent only those gangs and gang members that are known to law enforcement officials. Official records may particularly underestimate the prevalence of females in youth gangs; there have been reports that law enforcement officials often discount claims of gang membership by females. Estimates from youth self-report studies have indicated that anywhere from 2.7% to 10.6% of American adolescents are involved in gangs. However, these studies are limited by their regional scope, making it difficult to generalize their findings to gangs across the nation.

Although rates of gang membership are higher among Hispanic and African American youth, most gang members are white. Data from the National Youth Gang Center estimate females to constitute

14% of gang members; other studies have produced estimates ranging from 2% to 46%. Most members of youth gangs range from 15 to 17 years of age. Most gang members leave gangs after 1 year, with less than 5% remaining in these groups for 4 or more years. However, the increasing organization of gangs around drug sales provides a lucrative motivation for members to remain in these groups into adulthood.

ETIOLOGY OF GANG MEMBERSHIP

Research has identified community, family, peer, academic, and individual characteristics associated with gang membership. Gang-involved youth are more likely to live in communities characterized by social disorganization, high crime and gang activity, lack of viable employment and recreational opportunities, and greater availability of drugs and firearms. Gang-involved youth report spending more time with and having closer relationships with peers who engage in delinquency, substance use, or gang activity. Compared with nongang youth, gang members are significantly more likely to live in families characterized by inconsistent discipline, higher levels of family conflict, and lower levels of parental monitoring and supervision and parental warmth. They are also more likely to report having parents and siblings with a history of involvement in gangs or other criminal behavior. Individual characteristics associated with gang membership include endorsing favorable attitudes toward antisocial and sensation-seeking behaviors, exhibiting defiant attitudes and behavior, having low commitment to school and low educational aspirations, and exhibiting a history of academic failure and school-based behavior problems. Common coexisting psychological disorders include learning disabilities, substance use disorders, and conduct and oppositional defiant disorder.

FUNCTION OF GANGS

In addition to the friendship and support found in typical youth peer networks, gangs meet psychosocial needs that are unfulfilled by other social institutions. Gang members often describe gangs as providing a sense of family, love, and discipline. Indeed, many gangs have rules governing their members' behavior and accompanying sanctions for violating these rules. Gang members also frequently report having joined gangs because of the need for safety and protection in their neighborhoods. Ironically, though, gang members are more likely to be victimized by crime, particularly violent crime, than are youth who are not in gangs, and female gang members are at greater risk for sexual victimization.

The key feature that distinguishes gangs from other youth peer groups is that gang members have significantly higher rates of involvement in criminal activity, including drug sales, weapons possession, theft, and aggression toward others. Gang members are also significantly more likely to use alcohol, marijuana, and other drugs than are their non–gang-involved peers. Gang-involved youth account for a disproportionate amount of juvenile crime, and although their rates of delinquency and drug use decline upon their departure from gangs, the rates do not reach the low levels shown before gang membership and also remain higher than those of youth who never join gangs.

PREVENTION AND INTERVENTION EFFORTS

Despite the widespread public concern about gangs, there has been little systematic evaluation of prevention and intervention efforts. Gang prevention efforts have focused on preventing youth from joining gangs as well as interrupting gang formation. The most well-known modern prevention program is the Gang Resistance Education and Training Program (GREAT), a 9-week program for middle school students developed and delivered by law enforcement agencies. The curriculum includes topics such as conflict resolution, goal setting, resisting peer pressure, and the effect of gangs. A multisite evaluation of this program found that it has small but statistically significant effects on reducing gang activity immediately following program participation (9.8% of GREAT participants reported gang membership vs. 11.4% of nonparticipants); however, a longitudinal study found no short-term or long-term effects of the GREAT program.

Intervention efforts have largely focused on reducing the criminal activity of gang members through detached worker programming. Begun in the 1940s, this method involved deploying social workers into communities to provide alternative activities for gangs, including tutoring, weekly club meetings, sports activities, and individual counseling. Evaluation results for such programs have found them to be largely ineffective. Indeed, in some cases, they have resulted in increased gang cohesiveness. Other intervention

efforts have included providing alternatives to gang life, particularly education and employment, establishing truces between rival gangs to reduce intergang violence, and providing alternative recreational activities. In addition to these formal attempts at intervening in youth gang membership, there exist several naturally occurring interventions. Gang members frequently report that the most common reasons for leaving gangs, other than prison and death, include growing too old for the gang ("age-out"), getting married ("marry-out") or having a child, acquiring legitimate employment ("job-out"), or moving to another neighborhood.

Largely, however, resolution of gang problems has been left to police and law enforcement officials through suppression efforts. Using the combined efforts of police, prosecution, and incarceration, suppression efforts are aimed at reducing the criminal activity of gangs and disbanding them. Suppression programs typically involve dedicating additional financial and workforce resources to combat the gang program, often through the establishment of police gang intelligence units, and enacting legislation that imposes additional sanctions for gang-related criminal activity. These programs have shown mixed results; some have had substantial impact in reducing gang crime, whereas others have shown no demonstrable effect.

SUMMARY

Youth gangs pose a significant public health concern to the individuals who participate in them as well as to those individuals living in communities affected by them. Current intervention efforts rely heavily on suppression. However, if this social problem is to be adequately addressed, mental health professionals and developmental researchers must become more involved in developing and implementing effective treatment programs.

—Chanequa J. Walker-Barnes

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GARDNER, HOWARD (1943–)

Howard Gardner, a Harvard professor, cognitive research psychologist, and prolific author, is best known for his theory of multiple intelligences, first described in *Frames of Mind* (1983) and subsequently refined and extended in *Intelligence Reframed* (1999). Gardner's work has inspired teachers, school leaders, and special educators to embrace the notion that there is more than one way to be smart.

THE EMERGING THEORIST

Gardner was born in Scranton, Pennsylvania, in 1943, the son of refugees from Nazi Germany. A studious child, he loved to read, and developed into a gifted pianist. Although he dropped formal piano instruction as an adolescent, finding the practice obligations "onerous," he retained a lifelong passion for music that contributed to his nonunitary conception of human cognitive capacity.

FORMAL INQUIRY

Gardner undertook most of his formal training and graduate work at Harvard University, where he studied with noted psychologists and pursued, during his early career, research involving normal and gifted children, as well as brain-damaged adults. He maintained a voracious multidisciplinary reading, research, and writing schedule, and admitted, in later years, to

being a "happy workaholic." A prolific writer of journal articles and books during his early career, Gardner burst onto the international scene with his sweepingly popular book, *Frames of Mind* (1985).

THEORY OF MULTIPLE INTELLIGENCES

Faulting earlier unitary models of intellectual ability typically reported as a single IQ score, Gardner detailed a more complex paradigm in which human intelligence comprises eight or more relatively autonomous intellectual capacities: logical-mathematical intelligence, musical intelligence, linguistic intelligence, bodily-kinesthetic intelligence, spatial intelligence, interpersonal intelligence, intrapersonal intelligence, naturalist intelligence (added later), and possibly existential intelligence.

The theory of multiple intelligences became the guide for a multitude of school improvement efforts. Gardner and others promulgated the understanding of diverse student capacities, the need for personalized educational environments, improved interdisciplinary curricular programs, and the use of performance-based assessments. Educators have been inspired to adapt the theory and infuse its essence into school mission statements, curricula, individualized education plans, and instructional practice.

OTHER CONTRIBUTIONS

Gardner has written more than 20 books on creativity, leadership, discipline, socially responsible work, and ethics and has received the MacArthur Prize Fellowship, the Grawemeyer Award in Education, and a Guggenheim Fellowship. Howard Gardner is the John H. and Elisabeth A. Hobbs Professor of Cognition and Education at the Harvard Graduate School of Education and the Senior Director of Harvard Project Zero.

—Lynn Melby Gordon

See also Multiple Intelligences

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Howard Gardner, http://www.howardgardner.com

GATEWAY DRUG

Although the exact origin of the term *gateway drug* remains uncertain, the use of the term seems to have accelerated sharply in the early to mid-1980s in conjunction with the U.S. "war on drugs." The notion that the use of certain substances tends to precede the use of other substances, however, predates the widespread use of the term gateway drug. Initial research, for example, found that adolescent substance use tends to progress in four stages: abstinence, use of alcohol and cigarettes, use of marijuana, and use of other illicit substances. Further research suggests that this general progression is apparent among both males and females, although limited research suggests that cigarettes may play a more critical role in the progression among females, among those with and without arrest records, and across numerous nations in both Western and Eastern cultures.

Despite a wealth of empirical research suggesting that the use of certain substances tends to precede the use of others, there remain two separate meanings of the term gateway drug. According to one meaning, a gateway drug is one whose use precedes, but does *not necessarily cause*, the progression to more dangerous substances. According to a second meaning, a gateway drug is one that *both* precedes *and* causes an individual's escalation to more dangerous drugs. The distinction between these two definitions is critical for an accurate application of the gateway concept to the social control of substance use. Specifically, the second definition implies that preventing the use of drugs that come earlier in the general sequence would serve to prevent the use of drugs that come later in the sequence. The first definition, however, implies that preventing individuals from using drugs like alcohol and marijuana will not necessarily prevent them from using drugs like cocaine or heroin.

Although much political rhetoric suggests that society should crack down on the use of gateway drugs as a means of preventing individuals from progressing to more dangerous drugs, most research concerning the gateway concept has examined only the first of the above two definitions. Given the absence of widespread research concerning the second definition, political rhetoric concerning the need to crack down on the use of gateway drugs may be based on a faulty premise. Despite the reliable finding that the use of gateway substances *generally* precedes the use of

more dangerous substances, the same research simultaneously finds that the use of gateway drugs *does not always* precede the use of more dangerous substances. Efforts to stem the use of gateway drugs may therefore not serve reliably to prevent the use of more dangerous substances. Following an analogy developed in the research literature, slow and careful driving cannot legitimately be viewed as a cause of reckless driving even though the former almost invariably precede the latter.

Given the limited amount of research that has attempted to determine whether the use of substances early in the typical drug-use sequence actually *cause* the use of substances later in the same sequence, future research will likely be aimed at determining whether the former causes the latter. Establishing such a causal relationship will require the demonstration of an empirical finding that has not yet been demonstrated reliably. In particular, it will require demonstrating that the use of gateway substances increases the probability of using more dangerous substances even after controlling statistically for the influence of other variables that might be said to cause both early gateway drug use *and* the later use of more dangerous substances. Preliminary research, for example, has used longitudinal data from a sample of young adults to demonstrate that the time-one use of marijuana predicts the time-two use of more dangerous substances even after controlling statistically for such variables as age, race, stressful life events, gang membership, and prior hard drug use. Given the limited number of control variables used in such research, as well as its focus on only one gateway substance, further research will be needed before the scientific community will be able to claim with any degree of certainty that the use of gateway substances *causes* hard drug use.

—Cesar J. Rebellon

See also Addiction

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GAY MARRIAGES

Given the recent debate over the legitimacy of same-sex marriage, a discussion on gay and lesbian matrimony is appropriate. In this entry, we provide a brief historical account of same-sex unions, showing the foundation of the ageless debate over gay and lesbian marriage. We also address the present frequency of marriage between same-sex partners, providing the reader with a current account of states that allow for the union of gay and lesbian partners. Additionally, we discuss the social issues surrounding gay and lesbian partnership, highlighting some of the concerns brought forth by those arguing for and against same-sex

marriage. Finally, we conclude the paper with a brief discussion on the legal and political/tax issues surrounding the topic of gay and lesbian marriage. We hope to enlighten the reader about the various facets of this controversial issue.

HISTORY OF SAME-SEX UNIONS

Despite the recent controversy over the issue of gay and lesbian marriages, same-sex couples have been acknowledged throughout history, appearing in both philosophical and historical documents. Plato thought of the soul as a single entity that, at birth, is separated into halves. Within the possible divisions, Plato explicitly states soul mates could be two male halves or two female halves, suggesting that same-sex couples were recognized in Plato's time. Same-sex unions were at least acknowledged within ancient Greece.

Historical accounts of same-sex unions further support the presence of gay and lesbian marriages by suggesting that some societies formalized same-sex partnerships in ceremonies similar to weddings between man and woman. Although historians have argued over the semantics of these historical documents, evidence suggests that gay marriages were performed in the Mediterranean during the 16th century. Similar accounts of legal unions between lesbians have been recorded in 17th century China; ceremonies marking the cohabitation of lesbian couples were conducted, including legal documentation that allotted a successor to the couples' estate. Additionally, prosperous infertile women of Africa have been noted to buy wives, a process that includes giving the bride's family a dowry and purchasing a house for the newly acquired wife (it is interesting to note that the wealthy woman in these unions is referred to as the *husband*). Finally, gay marriages within Native American tribes have been documented since the 16th century. Timucua, Navajo, and Crow Indians, to name a few, have openly recognized "gay" relationships as legitimate partnerships. Within these formal relationships, one half of the couple takes the traditional role of the male, whereas the other half, referred to as the *berdache*, assumes the role of a traditional Indian wife. Historically, same-sex couples have been recognized across the globe.

FREQUENCY

Currently, only a few countries formally recognize same-sex couples. The trend started with Denmark's revolutionary acknowledgment of gay and lesbian marriage in 1989, inspiring a wave of legislation for equality in Northern European countries. States that have followed include Norway, Sweden, Iceland, and Finland. Similar trends have been seen in South America; Brazil and Costa Rica have adopted legislation that allows same-sex couples to have some of the benefits associated with heterosexual marriages. Most recently, Canada adopted legislation to grant gay and lesbian couples marriage rights, whereas the legality of this issue is currently being debated in the United States. There appears to be a global trend towards recognizing same-sex marriages.

SOCIAL ISSUES

The most common argument against recognizing same-sex marriage is that matrimony is an institution defined by a divine entity, and as a result, public opinion cannot alter the definition. The argument continues that, because there is no conclusive evidence to support the biological basis of a same-sex sexual orientation, granting gay and lesbian couples the right to marry would be unnatural and an abomination against nature. Furthermore, individuals arguing to keep marriage between one man and one woman suggest that this relationship is the moral thread that keeps society together; by altering this historical institution, we will be changing the norms of society.

Individuals advocating to keep marriage between heterosexual couples also argue that recognizing same-sex partnerships would undermine the social value of monogamy, greatly upsetting the institution of marriage. These advocates continue by suggesting that gay men are promiscuous, citing research indicating that gay relationships in Amsterdam last an average of 1.5 years. They further contend that these relationships are marked by multiple extrarelational affairs. However, it is important to note that this research was conducted with an unrepresentative sample composed of gay men attending sexually transmitted disease (STD) clinics and gay organizations, as well as through word of mouth. This greatly compromises the validity of this argument. Nevertheless, individuals arguing against recognizing same-sex partnership suggest that opening the institution of marriage up to promiscuous individuals will lead to polygamous and polyamorious—or group—marriages. This, they argue, would take all meaning out of the institution of marriage, greatly

undermining the social values on which this relationship is based.

Additionally, individuals arguing that marriage should remain between a man and a woman contend that the development of children is dependent on this formal relationship. Gay and lesbian matrimony denies children, should a same-sex couple choose to adopt, the benefits of having a mother and a father. They further contend that it is impossible for gay or lesbian parents to teach a child traditional gender roles, concluding that it is cruel to deny children the benefits of having one male and one female parent. However, research suggests that children raised by gay and lesbian parents are just as well adjusted as those from heterosexual households. The social issues surrounding the debate over same-sex marriage range from the religious to the effects of recognizing gay and lesbian matrimony on children.

LEGAL AND POLITICAL ISSUES

In addition to the numerous social issues invested in the topic of gay and lesbian matrimony, debate over the recognition of same-sex partnership has ramifications in regard to medical, legal, and political/tax issues. Currently, states failing to recognize the legitimacy of marriage between same-sex couples can deny gay and lesbian partners the right to make decisions about a life partner's medical treatment. This also infringes on a partner's ability to obtain visitation rights to see a partner or a partner's child staying in a hospital. Similarly, under the unfortunate possibility that an individual's same-sex partner becomes ill or even passes on, employers may have the ability to deny the individual the right to take a leave of absence to care or mourn for his or her partner.

Unfortunately, states that do not recognize the matrimony between same-sex couples can also have a detrimental impact on many legal aspects of a gay or lesbian couple's life. A gay or lesbian individual seeking refuge from domestic violence may be denied the right to file for a protection order. Additionally, some states may be able to reject a foreign individual's request for immigration or residency in his or her same-sex partner's native country. Similarly, the surviving member of a same-sex couple does not have the right to determine a partner's final resting place in some states that deny gay and lesbian matrimony. Furthermore, gay and lesbian couples may be denied the ability to obtain joint custody over children the couple may share, giving same-sex parents considerable legal limitations in countries that fail to acknowledge gay and lesbian marriages.

In addition to the aforementioned legal restrictions encountered by gay and lesbian couples, states failing to recognize same-sex marriage also have the ability to deny gay and lesbian couples numerous tax benefits associated with marriage. Same-sex couples may not be allowed to file joint tax returns, nor can they own property together. Similarly, employers in states that do not recognize same-sex unions may be able to legally refuse to grant a gay or lesbian partner health coverage, as well as restricting them from obtaining other employee benefits. Additionally, upon the unfortunate dissolution of a same-sex relationship, a dependent partner may not be entitled to receive an equitable settlement for property the couple may have acquired during their relationship. Finally, upon the death of a same-sex partner, the surviving member of the relationship is not entitled to the pension benefits of the deceased partner and, if a will was not created, may not be allowed to receive an inheritance. States failing to recognize same-sex unions greatly compromise many of the medical, legal, and political/tax rights of gay and lesbian individuals.

CONCLUSION

Although it is unlikely that the debate over same-sex marriages will subside in the near future, we hope the reader has become enlightened about much of the debate. We have provided the reader with a brief overview of the historical nature of this controversial topic, while also elucidating the frequency of gay and lesbian marriages. Similarly, we discussed many of the social contentions raised both for and against states recognizing same-sex marriages as a legitimate institution. Finally, we concluded with an overview of some of the legal and political/tax issues associated with gay and lesbian marriages, illustrating many of the rights that may be denied to same-sex couples living in states that fail to acknowledge marriage between gay or lesbian partners. We hope that the reader has been provided with a comprehensive overview of the issue, while also generating further interest in the topic that can be answered in some of the recommended readings offered at the conclusion of this article.

—Danny Osborne and Anne Duran

See also Homosexuality, Lesbians

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GENDER DIFFERENCES

How men and women, and girls and boys, differ from each other has been the focus of much study in developmental psychology. Numerous newspaper and magazines articles on the topic of gender differences attest to their importance outside developmental psychology as well. *Gender* refers to the societal, social, and behavioral ways that are associated with being male or female. This entry considers issues pertinent to the study of gender differences, examines gender differences and their causes from a variety of theoretical perspectives, and concludes with the social and political implications of these differences.

Discussion of gender differences entails many research issues. Foremost among them is the debate centered on whether the study of gender differences should continue. Arguments against continued study posit that cataloging of gender differences does not reveal their origins and, instead, reifies gender distinctions. Others charge that social scientists accept new discoveries, despite the possible discomfort such politically charged information may cause. Regardless of the validity of these arguments, many researchers argue that research into gender differences, especially with a focus on context, may begin to elucidate origins of these differences. We will return to this issue in greater depth in the conclusion of this entry, during the discussion of the political and social implications of gender differences.

Given the highly political nature of this topic, a few caveats are worth mentioning. First, when there are differences between girls and boys, the differences tend to be small. In fact, girls and boys are more alike than they are different. There are also large individual differences. For example, a particular girl may not act in a feminine-stereotyped manner. Second, gender differences vary depending on the context in which they are measured. For instance, when playing with same-gender peers, boys are more assertive than girls. Playing with girls, however, boys are no more assertive than girls. Thus, the answer to whether boys are more assertive than girls is contingent on their partner. Third, many sex differences, such as differences in math ability, are disappearing over time. The second two points suggest that gender differences may be magnified and perpetuated more by the cultural context of development than by biology alone. Finally, transgendered and some intersex individuals choose not to identify with either gender. As research continues to evolve on the topic of gender differences, the degree to which gender differences are maintained by the cultural milieu will be understood better.

DIFFERENCES BETWEEN MALES AND FEMALES

Cognitive and Intellectual Achievement

Developed in the late 1970s, meta-analysis enables the statistical combination of the findings of different studies to find an overall effect size. Psychologists have used meta-analyses of previous research to facilitate compilations of gender differences across many studies. Using meta-analytic techniques, Janet Shibley Hyde argues that males and females do not differ in general intelligence. However, Hyde and colleagues found differences in mathematics, verbal performance, and spatial rotation skills.

Mathematics

In most cases, Hyde and colleagues found that females were slightly superior to males in mathematics achievement, but this difference is small.

Depending on the particular type of math achievement studied, there are gender differences. For example, girls outperform boys in computation once children enter school until they finish high school, but there is no difference between girls and boys after high school. Until high school, there are no gender differences in problem-solving ability. Beginning in high school, however, boys outperform girls in problem-solving ability. In highly selected samples of gifted children, boys tend to surpass girls. Gender differences in math achievement have become smaller in recent years; this change suggests that as girls and boys are given equal access and encouragement in school, gender differences may eventually disappear.

Verbal Ability

Analogous to mathematics performance, Hyde found that females surpass males in verbal performance. Again, these differences are small. In fact, there is more overlap in scores between girls and boys and women and men than there are differences. Performance differences do not become apparent until age 26, when women surpass men in general verbal performance. When different types of verbal performance are examined, patterns diverge. For example, boys score higher than girls on vocabulary tests in early elementary school, but the difference reverses, with women performing better on vocabulary tests than men after age 19. In early elementary school, girls surpass boys in verbal ability with higher scores on early reading comprehension tests. As is the case with mathematics, differences between the genders are becoming smaller over time.

Spatial Ability

Marcia Linn found one cognitive difference that is more sizeable, which is the difference in spatial ability. Males surpass females in spatial ability tasks, such as rotating objects in space.

Academic Performance

Focusing specifically on gender, the American Association for University Women examined academic progress. Girls consistently earn better grades than boys across different subject matters. Additionally, girls are less likely to repeat a grade than boys. Women are more likely to go to college than men and earn 56% of the bachelor's degrees in the United States.

Contrasting with their achievement in good grades, however, girls sometimes perform more poorly on standardized tests than boys. The National Assessment of Educational Progress measures children's school performance via standardized assessments. In reading and writing, girls tend to score higher than boys, whereas in math, science, and geography, boys tend to score higher than girls.

When ethnicity is examined as well as gender, some of the gender differences disappear. For example, Latina girls score higher than Latino boys in reading as well as in math. African American girls score higher than African American boys in reading as well as science. These findings suggest that gender cannot be considered apart from other factors, such as ethnic background. They also underscore the variability that is found between girls and boys of different ethnic backgrounds and the need to understand gender in the context of other variables.

In summary, there are few gender differences in cognitive or intellectual achievement, and there are variations based on ethnic as well as gender differences. Although there are few differences in children's intellectual ability and achievement, there are differences in how children rate their abilities. For example, Jacquelynne Eccles found that girls are more likely than boys to attribute their success in math to effort than ability, whereas boys are more likely to attribute their success in math to ability rather than effort.

Social and Personality Differences

Few differences in personality arise between boys and girls. Some believe that boys are more physically active than girls. However, Eleanor Maccoby argues that activity level is context dependent. Playing alone, boys and girls are equally active. Playing with a same-gender pair, however, boys were more active than girls. That children's behavior changes so dramatically with a peer suggests that children may be constructing gender. Another difference when children play together is that boys are more likely than girls to engage in what Maccoby calls "rough-and-tumble play." That is, boys often wrestle together and will play physically.

In addition to observing larger gender differences, another important reason to study children playing in same-gender pairs is that children segregate based on

gender at a young age. Watching children on a playground or in a classroom, a casual observer notices that children tend to gender-segregate at an early age. Campbell Leaper argues that by the time children are 3 years old they select same-gender peer playmates. In same-gender pairs, girls' talk can be characterized by a collaborative style. Girls focus on social sensitivity and conflict mitigation while interacting with other girls. In other words, girls seem to prefer smooth social interactions with each other. Leaper finds that girls often use suggestions and begin sentences with "let's." In contrast, boy pairs are apt to have a dominant style. Boys tend to be assertive and heavy-handed during conflict. Boys use commands to control other children. However, when girls and boys play together, some of the differences disappear. For example, children are less controlling and domineering when they play with girls than with boys. Girls tend to be more assertive when paired with a boy than with a girl. Thus, children's perceptions of their partner mitigate some of the gender effects.

Some early research suggested that boys were more aggressive than girls. However, more recent research conducted by Nicki Crick and Jennifer Grotpeter suggests that levels of aggression are related to how psychologists operationally define aggression. Boys tend to display their aggression through physical means, whereas girls tend to display their aggression through verbal means, which is called *relational aggression*. For example, girls tease and exclude peers from a social activity with the intent of causing harm.

Emotional Differences

Exploration of gender differences in emotion has focused on differences in experience and expression. Although the research on emotional experience and expression contains many methodological problems, Leslie Brody's review finds that theorists believe that females, in comparison with their male counterparts, may be more emotionally expressive, shameful, envious, and helpless, and experience and express less anger and guilt. These suppositions are congruent with the widely held stereotype that women are more emotional than men. However, the empirical literature has not always upheld this stereotype.

In general, Brody reviews a sizeable amount of research showing marked differences in the emotional expressiveness of females compared with males. For example, work by Caroline Saarni has shown that girls are better at hiding negative emotions and are more likely to regulate their expression of emotion to keep in line with the display rules, or cultural standards, of the situation than are boys. Robin Fivush and colleagues suggest that girls place negative emotions, especially anger and fear, in a more interpersonal context than do boys. Consistent with this suggestion is the argument that males are less interpersonally oriented when compared with females. Moreover, Brody finds that males are less likely to express sadness and withdraw more from sad situations, whereas females exhibit their sadness in a more outward way, such as by crying. Fivush consistently finds that girls elaborate more when talking about emotions and generally talk more about emotions than do boys. As adults, women continue to talk about emotions more, and exhibit more intense emotional facial expressions than do men. In contrast, Brody suggests that as infants, boys express emotions–both facially and behaviorally–more intensely than do girls. Although differences in emotional experience and expression are found, these differences do not support the stereotype that women are more emotional than men.

Self-report measures reveal that males and females differ in the intensity and frequency in which they experience emotion. The specific emotions mentioned and the degree to which males and females differ, however, varies from study to study. Generally, females report more intense and more frequent emotional experiences when compared with their male counterparts, especially those associated with negative emotionality according to Stephanie Shields and Fivush. Notably, Brody finds that several studies have reported no significant sex differences in the experience of anger despite its stereotypical association with men.

Why do sex differences occur? Fivush has attributed these differences to various factors, such as the socialization of emotions by parents and peers, emotions being influenced by the culture and society in which one lives, and the situational context. For example, Judy Dunn found that mothers spoke more about emotions with girls than with boys.

Self-Esteem

Self-esteem refers to how highly an individual evaluates oneself. Although researchers had hypothesized that males would have higher self-esteem than females, Brenda Major's meta-analytic review finds that males have only slightly higher self-esteem than

females. Moreover, this gender difference seems to occur with females of European American ethnicity only. The American Association of University Women reports that compared with boys, girls' self-esteem drops after age 9. In contrast to European Americans, there is no difference between African American females and males. The lack of a difference in African American participants underscores that culture influences self-esteem and its expression.

Preferences

Anecdotal records suggest that children differ in their toy preferences. Researchers, such as Melissa Hines, have found that girls like to play with dolls and kitchen sets. Boys like to play with trucks and construction sets. These preferences are established by age 2. Similarly, girls and boys like to do different things. Boys prefer to play more actively than girls. Perhaps, the difference in preference for higher activity levels drives boys' preferences for certain toys.

Children endorse gender-typed behaviors and beliefs at a young age. Not surprisingly, boys uphold these beliefs more than do girls. Part of the reason boys may endorse the gender norms to a high degree is that males have more power than females in the society. Moreover, informal observations suggest that boys are more harshly criticized for failing to uphold gender norms than are girls. Consider, for example the negativity associated with the epithet, *sissy*, compared with its relatively less censuring counterpart, *tomboy*.

THEORIES OF GENDER DIFFERENCES AND DEVELOPMENT

Many theories have been proposed to explain gender development and why girls and boys may develop differently. These theories include biological, social learning, and cognitive approaches.

Biological Theories

Many biological theories of gender differences focus on hormonal influences. For obvious ethical reasons, we cannot experimentally manipulate individuals' hormonal levels simply to test the effects of hormones on gender development. However, there are "natural" experiments in which genetic conditions alter the amount of hormones to which fetuses are exposed. One such condition is congenital adrenal hyperplasia (CAH). In this condition, genetic males (i.e., possessing XY chromosomes) and genetic females (i.e., possessing XX chromosomes) are exposed prenatally to excess amount of androgen. As a result of the excess androgens, the genitalia of girls with CAH are often masculinized. At birth, a girl's enlarged clitoris may appear to be a phallus. Before the advent of routine genetic testing, girls with CAH were raised as boys. Presently, however, girls with CAH tend to be raised as girls. Some parents opt for medical interventions to change girls' genitalia. (However, surgery is controversial because it can destroy orgasmic function.)

Studying genetic females with CAH enables researchers to examine hormonal influences separate from biological sex. In her studies of girls prenatally exposed to androgen, Hines has compared girls with CAH, boys with CAH, unaffected girls, and unaffected boys. Although unaffected boys often engage in more rough-and-tumble play than unaffected girls, girls with CAH do not engage in more rough-and-tumble play than unaffected girls. However, Sheri Berenbaum and Hines find that girls with CAH prefer more masculine-stereotyped toys (e.g., playing with balls or guns) than unaffected girls. Hines suggests, thus, that hormonal influences may play a role in children's toy preferences. Of course it is difficult to tease apart social and cognitive factors. Girls with CAH may be aware that they are different from unaffected girls and think that they are more masculine than their unaffected peers. Moreover, that they do not demonstrate more rough-and-tumble play suggests that hormones do not control behavior. However, this is not meant to propose that hormonal influences do not contribute to gender differences. It seems that hormones may act in concert with the social environment to produce differences.

Learning Theories

According to social learning theorists such as Albert Bandura, children learn behaviors through modeling, reinforcement, motivation, and behavioral enactment. Children learn from modeling by paying selective attention to same-gender models that they imitate. For example, a daughter may decide to wear makeup after watching her mother apply makeup. A son may decide to pretend to shave after watching his father shave. Supporting social learning theory, experimental studies find that children imitate people of the same gender more than the other gender.

Another component of social learning theory posits that children receive reinforcement for performing behaviors that are stereotyped for their gender and receive punishment for performing behaviors that are stereotyped for the other gender. A study conducted by Beverly Fagot and colleagues revealed reinforcement of gender stereotypical behavior in young children. Day care providers were more likely to respond to gestures, gentle touch, and talk from girls than boys. In contrast, they were more likely to respond to physical action, screams, and whining from boys than girls. When the researchers returned to the day care site 11 months later, girls talked more than boys, whereas boys engaged in more negative behavior than did girls. From their findings, Fagot and colleagues maintained that the children developed their behaviors as a direct result of positive reinforcement from caregivers.

Contextual and Social Theories

Role Theory

Alice Eagly developed role theory, which suggests that personality differences arise from the different roles assigned to women and men. Most of these roles developed as a function of child rearing. She argues that were roles to become similar for men and women, gender differences in personality would disappear.

Social Psychological Theory

Kay Deaux and Major argue that the display of gender differences is predicated on how gender is negotiated between the perceiver and the target. All people bring beliefs about gender into their interactions that contribute to how gender is perceived and enacted within the interaction. A self-fulfilling prophecy results in the perpetuation of gendered behavior in social interaction. Moreover, perceivers may interpret behavior as conforming to gender norms more than it actually does.

Separate Cultures Theory

Play segregated by gender facilitates the development of gendered norms in play. Maccoby suggests that these norms perpetuate separate cultures for males and females, which lead to gender differences in behavior.

Cognitive Theories

Cognitive Developmental Theory

Lawrence Kohlberg proposed a cognitive development theory in which children go through various stages in their development of gender-typed behavior and identity. In the first stage, gender identity, children are able to label themselves, which typically occurs when children are 2 years old. Between 3 and 4 years of age, children begin to understand that gender is stable over time. For example, children realize that when they grow up, they will remain the same gender. Entrance into the third stage, gender constancy, is predicated on the gender constancy or the belief that gender remains constant across situations. For instance, children understand that even were they to engage in cross-gender typed behaviors (e.g., a boy playing with baby dolls), their gender would not change. Kohlberg believes that it is not until children have achieved gender constancy that they engage in gender-typed behaviors. At this point, children identify with their same-gender group and try to act like other members of their gender group.

Critiques of cognitive developmental theory are many. One important criticism is that children act in a gender-stereotypical manner long before they have achieved gender constancy.

Gender Schema Theory

Building on prior schema theories, Sandra Bem, Hazel Markus, and Carol Martin proposed gender schema theory in the early 1980s. Gender schema theory emerged from cognitive developmental theory and information-processing theory. It applies gender to more general schema theories. Simply put, a schema is a conceptual network that helps people reason more effectively and quickly. Schemas allow people to interpret their experiences, understand their past, and make inferences about behavior. Consequently, in gender schema theory, peoples' theories about gender allow them to simplify a large body of knowledge and to apply this knowledge easily to themselves and to others.

Martin posits that through involvement and observation of cultural practices, children begin to understand that gender is a dichotomous organizer of cultural activities, forming the basis for their gender schema. Once these schemas are internalized, children and adults sort traits, behaviors, and activities into two

categories: one for women and one for men. After sorting these traits, behaviors, and so forth, individuals select the ones that are consonant with their gender stereotype. In an experimental study, Martin and colleagues showed individual children novel objects that were placed in boxes labeled "for girls," "for boys," or "for both girls and boys." The researchers took the objects out of the box and taught children three things about the objects. Children were left alone in a room to explore the objects. A week later, children returned to the university laboratory and were tested about the objects. As expected, children were more likely to explore objects that were labeled for their own gender. Moreover, children remembered more about the objects labeled for their gender. Simply labeling an object for one's gender is enough to make children prefer an object.

SOCIALIZING AGENTS

Social learning and cognitive theories similarly agree that children learn about gender stereotypes from interacting with others. Most people accept that children do not develop in isolation, but instead learn in relationships with important others. Thus, it is important to examine what children might learn about gender in their daily lives both by observing others and through actual interactions with others.

Parents

Children's earliest and arguably most important relationships begin with their parents. Beginning in infancy, parents treat girls and boys differently. How different, however, is debatable. For instance, a meta-analysis conducted by Hugh Lytton and David Romney found that the only way in which parents treated girls and boys differently was that they encouraged children's gender stereotypical preferences. Most of the articles they reviewed relied on self-report measures, such as questionnaires asking parents how they treated their children. Leaper and colleagues reviewed studies that actually examined mothers talking with their children. In their review, they found larger differences. For instance, mothers talked more to girls than to boys. Parents may also speak differently to sons and daughters. For example, Harriet Tenenbaum and Leaper examined parents' scientific explanations to their children during everyday science conversations. Girls and boys did not differ in their math or science grades, interest, or confidence. Despite the lack of differences between girls and boys, fathers used more scientific explanations with their sons than with their daughters. In contrast, fathers asked more questions of daughters than of sons while discussing an interpersonal conflict. Fathers' talk may help boys develop more in-depth knowledge about science and help girls develop interpersonal skills.

Teachers

Much research suggests that girls receive less of teachers' attention within classrooms than do boys. Allison Kelly's meta-analysis of 81 studies found that, in general, boys received more teacher attention than did girls. For example, it was found that boys received more praise, criticism, and response opportunities. The only exception to boys' advantage was that girls were more likely to receive a second chance to answer teachers' questions. In general, it seems, boys receive more teacher attention than do girls. Moreover, many schools perpetuate children's differences through practices such as having children forming separate lines or teams during class work.

Peers

By playing with same-gender peers, children create sex differences. For example, children's play with same-gender peers may follow gender-appropriate behaviors more strictly than when playing with other-gender peers. Moreover, children police each other's adoption of gender-appropriate behaviors. Throughout childhood, children may more strictly enforce adherence to gender than other socializing agents.

SOCIAL AND POLITICAL IMPLICATIONS

Lively debate attests to the social and political implications of the study of gender differences. Foremost amongst the debate is the concern that attention to difference will depict women as inferior to men. This concern stems from women's societal oppression. Effects of women's inferior societal position include, but are not limited to, women's lower wages than men, women's increased risk for sexual and physical abuse at the hands of men, and that girls are less likely to be educated in much of the world than are boys.

Resulting from this concern, some feminist scholars have argued for the discontinued study of gender

differences. For example, Bernice Lott posits that compilation of sex differences will increase men's power. These concerns are not unfounded. According to Eccles, mothers' endorsement of the cultural stereotypes favoring boys over girls in mathematics ability correlated with mothers' lower perceptions of their daughters' mathematics abilities.

According to Eagly, feminist scholars studying gender differences historically have followed two main research agendas. The first was to render differences as minimal to demonstrate that women and men are basically the same, and thus equal. In this way, psychologists could demonstrate that cultural stereotypes are not based in reality. Because men are viewed as the norm, any difference from men is deficient. The second main feminist agenda allowed for differences between men and women, but viewed women as superior (e.g., more caring, nurturing) than men. These two approaches are so common in scientific psychology that Rachel Hare-Mutin and Jeanne Marecek termed the first a *beta bias,* which is a preference to minimize differences. In contrast, an *alpha bias* is the desire to exaggerate gender differences.

Viewing gender as constructed in social interaction, Marecek debates whether gender is a stable, internal, individual difference characteristic. Moreover, given that generic men and women, girls and boys, do not exist, how can knowing about average characteristics uncover understanding of behavior? Instead, Marecek argues that gender needs to be understood in its sociocultural historical context. Indeed, as mentioned throughout this review, gender differences are not stable across different ethnic and cultural groups.

Another concern raised by feminists, such as Carol Tavris, is that documenting sex differences will not enable understanding of the power differential. For example, given women's higher academic achievement, why do they earn less money than men? Eagley counters with hopes that continued study of gender differences will give rise to an understanding of the causes of gender inequities. This information will then aid feminists in decreasing women's unequal societal status.

SUMMARY

There are small gender differences in specific cognitive abilities, personality attributes, and emotional expression. Gender differences in preferences are larger. The antecedents and causes of gender differences are not yet fully understood. Continued research on gender differences, as well as the political implications, will enable a greater understanding of gender in context.

—Harriet R. Tenenbaum and Naomi Aldrich

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GENDER IDENTITY

All children learn that they are either male or female, but what meaning do they give to the fact that they are one sex and not the other? In all cultures, boys and girls are expected to behave differently, and thus it is likely that children worldwide occasionally reflect on questions such as these: Am I living up to the expectations of my sex? Am I fortunate or am I disadvantaged to be the sex I am? Must I limit my actions to same-sex-typical behavior, or am I free to explore cross-sex options? Children's answers to these questions affect their adjustment and their development.

Here we summarize the ways that children's gender identity has been conceptualized, review the development of several major components of gender identity, and discuss the implications of gender identity for children's adjustment and development.

WHAT IS GENDER IDENTITY?

Different theorists have conceptualized gender identity in different ways. A classic approach is that of Lawrence Kohlberg, who viewed gender identity as simply knowing one's sex. Gender identity has also been defined as the degree to which one perceives the self as conforming to cultural stereotypes for one's gender, as the degree to which one internalizes societal pressure for gender conformity, or as a fundamental sense of acceptance of, and of belonging to, one's gender.

Susan Egan and David Perry proposed that it is useful to conceive of gender identity as multidimensional. In their model, gender identity has five major components: (1) membership knowledge (knowledge of one's membership in a gender category); (2) gender typicality (felt similarity to others of one's gender); (3) gender contentedness (satisfaction with one's gender assignment); (4) felt pressure for gender conformity (pressure felt from parents, peers, and the self for conforming to gender stereotypes); and (5) intergroup bias (the belief that one's own sex is superior to the other). Thus, gender identity is defined as the collection of thoughts and feelings a person has about membership in a gender category. Note that gender identity concerns more than people's self-perceptions of specific sex-typed attributes, such as competency in math, possession of instrumental or expressive traits, or sexual orientation; it is concerned with the overall sense people make of the fact that they belong to one sex and not the other.

DEVELOPMENT OF GENDER IDENTITY

The membership knowledge component of gender identity begins early. By age 3, most children attain "basic gender identity," or can answer correctly the question, "Are you a boy or a girl?" However, children do not attain "gender constancy," or understand that their gender is fixed and does not depend on superficial factors such as the clothes they wear or the toys they play with, until about age 6. Shortly after children attain basic gender identity, they show signs of three other components of gender identity—gender contentedness, felt pressure for gender conformity, and intergroup bias. Thus, preschoolers usually voice happiness with their gender, feel it is imperative to behave like others of their gender, and develop "intergroup cognitions," such as hostility toward the other sex and the belief that their own sex is superior. A few years later, the final component of gender identity—an estimate of one's gender typicality—develops. Gender typicality reflects children's idiosyncratic weighting and integrating of diverse information about their sex typing, with different children of the same sex feeling gender typical (or atypical) for different reasons (e.g., one boy may derive a sense of typicality from athletic prowess, another from competence in math or science). At the same time as children are developing a sense of gender typicality, they usually relax their intergroup bias (i.e., voice less negativity toward the other sex) and relax their felt pressure for gender conformity (i.e., become less inclined to view cross-sex-typed activities as strictly prohibited).

IMPLICATIONS OF GENDER IDENTITY FOR CHILDREN'S DEVELOPMENT AND ADJUSTMENT

Considerable controversy surrounds the implications of gender identity for children's development and adjustment. Kohlberg argued that gender constancy (attained at about age 6) was necessary before children would show "self-socialization of gender typing," or the tendency to adopt behaviors perceived as appropriate for one's gender. However, it appears that basic gender identity (acquired at about age 3) is sufficient to set in motion a number of sex-typing processes (e.g., imitation of same-sex models, preference for play with same-sex peers) as well as cognitive processes (e.g., intergroup cognitions) that encourage gender differentiation.

Much argument has centered on the question of whether a "strong" gender identity carries positive or negative implications for adjustment. The classic position, beginning with Sigmund Freud, has been that a strong and secure sense of gender identity (a stable and confident sense that one is a typical and adequate member of one's gender category) is good for mental health. Consistent with this view is evidence that children who are diagnosed with gender identity disorder (who have a strong desire to be the other sex and who exhibit marked cross-sex behavior) are decidedly distressed. The source of these children's distress, however, is unclear; it may be that the negative social reactions these children incur (from parents, teachers, and playmates) are the problem.

In the 1970s, a challenge to the traditional position that strong gender identity is healthy was offered by

Sandra Bem, who argued that the more an individual's membership in a gender category is a salient feature of the individual's psyche (i.e., the more an individual conceives of the self as either "masculine" or "feminine"), the poorer will be the individual's mental health. Her argument was that a person who feels strongly masculine or feminine (someone she labeled "gender schematic") must be experiencing strong internalized societal pressures for gender conformity that limit the person's options for happiness and undermine the person's sense of autonomy, thereby undermining mental health.

Evidence bearing on the Bem hypothesis is inconclusive, perhaps because Bem did not directly assess people's felt pressure for gender conformity; instead, she inferred it from the degree to which people fail to perceive both male-typed and female-typed personality traits in the self-concept (e.g., if a person reported many instrumental traits and few expressive traits in the self-concept, it was assumed that the person was experiencing strong internalized pressure to be male typical). Thus, although Bem's conceptualization of gender identity was in terms of felt pressure, her measure of it was closer to a measure of gender typicality. Egan and Perry's work shows that felt pressure for gender conformity and felt gender typicality are uncorrelated. Another problem is that Bem's measures of male and female typicality relied too strongly on self-perceived instrumental and expressive traits. People's self-perceived gender typicality is affected by more than these traits (e.g., appearance, recreational activities, academic competencies).

Recent work on the relation of gender identity to adjustment suggests a more complex picture than that suggested either by a simple "gender identity is good" or a simple "gender identity is bad" hypothesis. Whether gender identity is a favorable or an unfavorable influence depends on the component of gender identity in question. In research in which the several Egan and Perry components of gender identity have been assessed, feelings of gender typicality and of gender contentedness have been found to be favorable influences on adjustment (e.g., self-esteem, acceptance by peers, absence of internalizing symptoms), whereas felt pressure for gender conformity has been found to be detrimental to adjustment. Thus, both the traditional view that gender identity is good and Bem's view that gender identity is bad receive support, depending on the component of gender identity assessed. In summary, children who feel gender typical, who are happy with their gender assignment, and who do not feel anxious at the thought of exploring cross-sex activities (a combination that might be labeled "secure gender identity") enjoy optimal adjustment.

FUTURE DIRECTIONS

Contextual influences on gender identity need more study. Some aspects of gender identity are relatively stable parts of people's psyches (e.g., the Egan and Perry components), but contextually elicited gender identity might be important, too (e.g., being the only female member of a group may make being female salient). Situationally elicited gender identity may have consequences, such as causing gender-stereotyped behavior.

Finally, to understand how gender identity affects adjustment and behavior, researchers should assess not only each individual's gender identity components but also the idiosyncratic meanings that each individual accords to gender. If, for example, some girls define being female as being a compassionate leader, whereas other girls define being female as being subservient and dependent, it may be that gender identity will bear different relations to adjustment for the two sorts of girls. For example, feeling content with one's gender assignment may be associated with agentic competencies (e.g., assertion, leadership) for the former girls but with helplessness and depression for the latter. Thus, measuring children's "gender relevance beliefs" (the attributes people view as relevant to each gender role) need to be studied hand in hand with gender identity.

—David G. Perry

See also Gender Identity, Gender Role Development, Homosexuality

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GENDER ROLE DEVELOPMENT

Gender is one of the most central attributes people have and an object of endless interest across all societies. Thus it should not be surprising that children are also aware of gender-related characteristics and quickly come to display those qualities themselves well before their own sexual maturity. What *is* surprising is just how early gender awareness emerges developmentally and just how pervasive its effects are. The present paper summarizes what we know about how gender differences develop over the childhood years, and what theoretical ideas have been proposed as to the basis for gender role development.

NORMATIVE GENDER ROLE DEVELOPMENT

Diane Ruble and Carol Martin have organized research on gender role development around four major gender-typing components: (1) concepts or beliefs, (2) gender identity or self-perception, (3) verbalized gendered preferences, and (4) display of gender-typed behaviors. They review evidence showing that even in infancy, children are already able to distinguish between the two sexes in rudimentary ways. For example, 7-month-olds respond differently to male and female voices, and by 12 months of age, many infants can distinguish between male and female faces. Similarly, ideas about gender stereotypes regarding toy, activity, and clothing preferences are already evident from about age 2 or 3, and rapidly progress further during the subsequent toddler and preschool years. Knowledge of stereotypes continues to expand in the middle childhood years, but children's advancing cognitive development also leads them to more flexible thinking about gender roles as they further mature during this age period. Children's understanding of gender identity or self-perception likewise progresses systematically during the toddler and preschool years, moving from a simple ability to label the self as a boy or a girl, to understanding that gender is stable over time (e.g., understanding that a boy can become a "daddy" but not a "mommy"), and finally to a full understanding of the permanence of gender assignment even across clothing and hairstyle changes (gender *constancy*, achieved at about age 5 to 7). Developmental trends for verbalized gendered preferences parallel those for stereotype knowledge, with some preferences beginning to be expressed as early as age 2 to 3, and well established by age 5. Finally, behaviorally, gendered toy play has been found to emerge even earlier, by age 1½ to 2. And by age 3, both sexes show a clear preference for playing with same-sex partners. Research further indicates that gendered differences in interests and activities continue through the childhood years and may even intensify in adolescence.

What might account for such early and pervasive gender role development? A number of theories have been advanced to address this question.

THEORIES OF GENDER ROLE DEVELOPMENT

Theories of gender role development fall into two major categories, namely, biological and social-cognitive. Biologically oriented theories, such as that of John Money and Anke Ehrhardt, have focused on the many genetic, anatomical, and hormonal differences between the sexes as providing the major basis for the gender role distinctions shown by males and females. For example, biologically based sex-linked characteristics evident from early infancy may predispose boys and girls to favor those activities typically associated with their gender (more muscular, active boys may therefore be predisposed toward risk taking, aggression, and rough-and-tumble play; more verbal girls may therefore be predisposed toward more verbally oriented play). At the same time, intertwined environmental influences cannot be excluded. For example, Eleanor Maccoby has suggested that parents may play more roughly with their more muscular, active sons than with their quieter, more verbal daughters, with such experiences also contributing to children's later gendered development. Money and Ehrhardt's *biosocial* theory incorporates social as well as biological factors by stressing how early gendered socialization experiences combine with the impact of prenatal biological developments, particularly hormonal influences. In support

of such biological perspectives, the large empirical literature on hormonal influences (e.g., with androgenized females exposed to male hormones during prenatal development) demonstrates a wide range of hormonally based effects, but also makes clear the intertwined effects of social experience. A *psychobiosocial* model recently proposed by Diane Halpern has further extended the notion of two-way interactive effects by stressing the impacts that early experience may have on the extent to which neural pathways develop in different parts of the brain.

Although biologically oriented theories do particularly well in spelling out the nature of biologically related influences on gender role development, to find more detailed treatments of socialization factors, it is necessary to turn to the array of theories that emphasize social-cognitive influences. Freud's *psychoanalytic* theory stresses the role of the identification process with the same-sex parent that takes place in the phallic stage of psychosexual development (age 3 to 6). Freud believed that the child identified with the same-sex parent as a way of resolving the conflict associated with having an incestuous desire for the parent of the opposite sex (the Oedipus complex in boys, Electra complex in girls). Because of the more intense threat (fear of castration) experienced by boys, Freud felt that the identification process and subsequent adoption of gender-typed characteristics would be stronger for boys than for girls. Although empirical work has been consistent with Freud's idea that gendered behaviors emerge in the early childhood years, it has not supported many other features of his theory. For example, research by Sandra Bem indicates that children of age 4 to 6 lack accurate understanding of the genitalia differences between males and females, and thus it is difficult to argue for castration anxiety as playing a major role in the conflict experienced at this age level.

A wide range of *cognitively* oriented theories offers another kind of useful perspective on gender role development. These theories all stress the ways in which children engage in self-socialization processes, that is, actively attempt to acquire an understanding of gender roles and their own gender identity. Lawrence Kohlberg's *cognitive-developmental* theory proposed that children progress through three stages in this regard, beginning with showing an understanding of basic gender identity at about age 3, then coming to understand the stability of gender over time, and finally achieving full understanding of the invariance of gender at about age 5 to 7. He argued that a full cognitive understanding of the constancy of gender was necessary before a child would be motivated to engage in a gendered self-socialization process, only then seeking out and paying particular attention to same-sex others. Although empirical research has supported the idea that children gradually progress through these three stages of gender understanding, the assertion that full understanding is required for gender-typing does not fit well with what we know about the extensive gender knowledge and behavior of younger children. Carol Martin and Charles Halverson's *gender schema* theory proposed a variation on Kohlberg's views by suggesting that *basic* gender identity is sufficient to instigate the self-socialization process in young children, with children then motivated to attend to information about gender and use it to construct organized ideas ("gender schemas") about the two sexes. Young children are believed to first acquire general ideas about what roles and activities characterize each sex ("in-group/out-group" schemas), and then develop detailed notions about those things seen as appropriate for their own sex ("own-sex schemas"). Yet another influential cognitive perspective relates to Sandra Bem's views on the limitations associated with being strongly gender schematic (highly masculine or highly feminine in one's gender typing) and the advantages of *androgyny* (having a blend of both masculine and feminine attributes). Empirical research has supported Bem's assertion that androgyny may often be advantageous for children as well as adults, but the issue of the extent to which gender typicality is a desirable or undesirable attribute remains a subject of debate, and recent findings by Susan Egan and David Perry in fact suggest that it may be a positive factor for children's development.

Albert Bandura's social cognitive theory is likewise strongly cognitive in emphasis, but it also draws on a broad array of other factors, including motivational, affective, and environmental ones. Bandura posits three major types of influences that operate to promote gender role development: (1) modeling (observing gender-relevant conceptions and behaviors from a wide range of sources, including family members, peers, teachers, and the media), (2) enactive or direct experience (gender-relevant learning related to the consequences experienced for the child's own actions), and (3) direct tuition (direct instruction, such as statements about what is appropriate for each sex). These influences affect not only the development of gender-related knowledge and skills in children but

also cognitions centrally involved in behavior regulation (outcome expectancies, self-evaluative standards, and self-efficacy beliefs). Importantly, the child is viewed as playing a very active role in development. Children are not simply acted on by their social environments; they also exert effects on and produce changes in those environments. Specifically, personal, behavioral, and environmental factors are all posited to mutually influence one another in this approach (*triadic reciprocity*). Gender research findings have provided extensive support for the relevance of the components in Bandura's multidimensional approach. Nevertheless, the issue of whether social cognitive theory is sufficiently comprehensive to stand alone as the theoretical framework for gender role development is a subject of debate, and it can be argued that there is much to be gained from continuing to explore alternative perspectives as well.

INTEGRATION AND FUTURE DIRECTIONS

In summary, gender role development is a central domain that affects children from infancy onward across all areas of their functioning. One theme apparent in the diversity of theoretical approaches advanced to explain gendered development relates to recognition of the important part biological forces have. These forces are viewed not as acting in a deterministic way, but rather as providing biologically based predispositions that operate in intimate concert along with environmentally based influences. A second theme pertains to the frequent stress placed on the role of cognitive processes. The multiple cognitively oriented theories agree in their recognition of the important roles that cognitions play in gender role development, although they vary in the specific kinds of elements and processes given most emphasis.

Integrative approaches incorporating the strengths of the various individual theories in an overall eclectic perspective are likely to best serve advancement of our understanding in this field. Promising directions of future research may be found in every area. Modern theoretical and methodological developments in the neuroscience and evolutionary theory areas are opening up exciting new directions of biologically oriented investigation. In the cognitive theory domain, the same may be said, with new conceptualizations and measurement tools showing the promise of doing much to further advance our knowledge. For example, Liben and Bigler have made significant new contributions with their work on new gender-typing measures widely applicable across a broad age range. Additional directions of research have also been opened up by the recent work of David Perry and his associates on newly proposed summary-level measures related to gendered representations of the self (e.g., gender typicality, contentedness, and felt pressure for gender role conformity). In conjunction with the increasing use of multidimensional, longitudinal designs, these developments may be expected to add considerably to our understanding of this complex but endlessly fascinating topic.

—Louise C. Perry

See also Gender Identity

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GENERALIZABILITY

Experiments in human development attempt to identify the influence of variables or events on human behavior. These experiments contribute to the shared knowledge of the community that seeks to understand human development by describing the course of human development, predicting how individual humans will develop, and arranging optimal environments for

growth. Before experiments can contribute to an understanding of human development, they must fulfill two criteria: accuracy and generalizability. How accurate the results of an experiment are can be determined by asking, "How well did the experimenters rule out other possible explanations for the observed results?" If it can be reasonably assured that the results are accurate for a given experiment, we may then begin to ask questions of generalizability.

When an experiment is conducted, it would be impossible (in terms of time, effort, and finances) to measure all of the important behavior of all the world's humans. Instead, researchers observe some important behavior of a smaller group of participants, called a *sample*, in a limited number of settings. *Generalizability* is the extent to which outcomes of observations with a sample represent the performance of the larger population under similar conditions. Typically, consumers of research are concerned with generalizability across different groups, but they may also be interested in generalizability across settings and behaviors.

If a large group of infants was observed to all begin walking by about 10 months of age, would it be appropriate to conclude that all infants learn to walk by 10 months? If mothers reacted with joy and glee each time their babies smiled in a laboratory setting, and the babies smiling increased dramatically when this type of parental response was consistent, would it be appropriate to conclude that all babies learn to smile through social interaction with mothers? If babies do learn to smile from their mother's approval, would it be safe to assume that they also learn other behaviors from their mothers' approval, such as crawling or walking?

These are questions relevant to the generalizability of results. They are important questions because it is crucial to be able to apply what is learned under one set of conditions in the past to many of the important situations occurring in the present. Nevertheless, the tentative nature of science suggests that the answer to all of the questions above is "No." Infants raised in cultures other than those represented in the original study may not learn to walk until they reach 12 months. Mothers may respond to smiling in different ways outside of the laboratory setting, and other important infant behaviors may develop independent of parental social interaction.

Increased generalizability can be obtained in one of two ways. The first involves replicating studies (i.e., doing them again) with different participants, in different settings, or while measuring different behaviors. This method is direct in that similar analyses are replicated across relevant new dimensions. The second involves including a large and diverse sample of participants, settings, or behaviors into the initial experiment. Generalizations of findings from samples to populations are made with the most confidence when the critical dimensions of the population are equally represented in the sample; this is usually achieved through systematic sampling and assignment techniques. Ultimately, generalizability, the successful extension of findings to people and situations beyond those of the original experiment, is achieved by assessing the impact of the same or similar variables on an ever-widening subset of participants, behaviors, and settings.

—Jeffrey H. Tiger and Gregory P. Hanley

See also Experimental Method

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GENERALIZED ANXIETY DISORDER

The Diagnostic and Statistical Manual of Mental Disorders characterizes generalized anxiety disorder (GAD) as a problem attributable largely to excessive worry. In recognition of the heightened levels of worry and anxiety common to all anxiety disorders, some have considered GAD a core anxiety disorder. Although worry is central to GAD, additional necessary features for the diagnosis include the following:

- Difficulty controlling the worry
- Combinations of three or more physical and emotional concomitants of the worry (i.e., restlessness, easily fatigued, concentration and attention problems, irritability, muscle tension, and sleep disturbance)
- Worry is not due only to another primary psychological problem (i.e., worrying about having a manic episode in the case of bipolar disorder).

- Significant impairment in social, occupational, or role functioning
- Worry and associated disturbance is not due to effects of a substance or other medical problem

ETIOLOGICAL FACTORS

Although worry is considered a core feature of anxiety disorders, and GAD is considered a classic anxiety problem, there is little consensus regarding the etiologies of both worry and GAD. In general, individuals with GAD have high trait anxiety, which is the stable tendency to respond to stress with high levels of anxiety. One etiological model proposes that GAD arises from several, largely genetic, predispositions. These genetic predispositions are associated with a general anxious vulnerability, composed of the following elements:

- *Processing bias*: the tendency to view neutral or ambiguous stimuli as threatening, and a corresponding tendency to conclude there are no alternatives to exposure to threat
- *Avoidance*: a coping style that is excessively reliant on avoidance of the threatening stimuli as a means of managing anxiety
- *Arousal/emotionality*: refers to the heightened physical arousal, interpreted by the individual as anxiety that accompanies the processing bias

A closely related etiologic explanation of worry in general, and GAD in particular, involves avoidance theory. Central to this perspective is the counterintuitive premise that worrying shields the individual from experiencing even greater levels of anxiety associated with anticipated poor coping and a resultant negative outcome. At a basic level, chronic worriers have been found to have significantly less physiological arousal when worrying (a predominantly verbal activity) than while imagining a scene associated with the worry. Additional evidence suggesting that worriers have a basic assumption of poor coping ability shows that individuals with chronic worry also perceive themselves as less effective when faced with challenges and responding to stress.

Problematic in conceptualizations of GAD and worry is the role of worry in everyday life. Worry is a common experience, and many have suggested it is essential for some tasks, particularly certain types of problem solving where the individual has lower confidence in their ability to meet the challenge posed. Investigators have speculated that GAD is a fairly common disorder (lifetime prevalence between 4% and 7%), but drawing a clear distinction between normal (and possibly intense) worry compared with pathological worry has been difficult.

TREATMENT

The availability of empirically supported treatment for GAD is fairly recent. Most of the research investigating how to manage excessive worry has involved a combination of cognitive and behavioral interventions. These interventions have been varied, ranging from individually applied relaxation or biofeedback to comprehensive treatment packages such as multicomponent cognitive behavioral therapy (CBT) or anxiety management training. A recent review of the available treatment literature supports CBT as producing the best outcome (both immediate and with maintenance of gains).

CBT, as it is currently applied for GAD, involves identifying specific errors in thinking that contribute to worry, including faulty beliefs about the likelihood of catastrophe and a pessimistic view of one's chances of coping successfully. However, unlike in the case of obsessive-compulsive disorder (OCD), individuals with GAD appear to have a wider range of cognitive distortions. Some common distortions are as follows:

- *Fortune telling*: in the absence of supporting evidence, the specific belief that the future events will turn out negatively
- *Negative filtering/positive discounting*: an increased focus on negative outcomes, while downplaying positive events as trivial
- *Overgeneralizing*: applying the negative outcome from one event and assuming it will occur the same way for all other events
- *Black and white thinking*: placing all events into either all positive or all negative categories, with no intermediary conditions

These common distortions may contribute to worry, although none of these is pathogenic of worry, and can be readily identified in other conditions. So what makes these cognitive distortions particularly relevant in the case of worry? Notice that in most of the cognitive distortions, there is a future-oriented negative outcome. This is one fundamental distinction that can be brought to bear for anxiety conditions in general, and for worry in particular.

Treatment using CBT involves systematically identifying which of these distortions best apply to

someone with worry. Once this has been established, the client and therapist engage in a collaborative effort to determine how to challenge these spontaneously occurring distortions and to apply these challenges in situations that give rise to worry.

As noted, CBT is a comprehensive treatment package. Other important components include training GAD sufferers in more effective problem solving than chronic worrying and exposure to reduce the naturally occurring avoidance that worry produces. Problem solving involves developing a systematic approach to understanding the common problems that individuals face and determining ways of best resolving the situations. These analogue problems can then be applied to problems common to the client. This frequently includes managing emotional responses when faced with difficult situations and understanding that not all problems are readily solved. With repeated practice, adaptive coping responses would be strengthened, particularly for some ongoing problems that require periodic management.

Although CBT has been found to be an effective treatment for GAD, the most recent research suggests that interpersonal functioning must also be addressed in order for GAD sufferers to achieve a long-term positive outcome. Preliminary evidence from one treatment outcome study suggests that individuals with GAD who receive an additional treatment component focused exclusively on interpersonal functioning have improved progress. The mechanism of action for the improved outcome associated with interpersonal functioning among worriers is not clear. However, it has been speculated that improved interpersonal functioning also improves perspective taking (frequently addressed in CBT via challenging cognitive distortions) and increases the GAD sufferer's sense of effectiveness.

—Dean McKay and Kevin McKiernan

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GENERATION GAP

The concept of the generation gap is one that has become part of our cultural vernacular. Reputedly coined by renowned anthropologist Margaret Mead, the simplest definition of the concept is the differentiation (or gap) of values, attitudes, or behaviors between members of an older generation and a younger generation. Typically, the concept of the generation gap is used as an explanation of conflict between parents and children within individual families. The concept gained particular notoriety during the 1960s and 1970s, when numerous articles and books commented on the differences between baby boomers and their parents.

The gaps between generations can be considered in two particular ways. The first is when comparisons are made at different times between generations at similar ages, such as comparing a parent's high school experiences relative to his or her child's high school experiences. The classic example of this is the popular saying by older family members, "when I was in school, I walked a mile in the snow." The second approach is to examine across groups at the same point in time. For example, parents and adult children may experience conflict about child rearing, whereby the gap may be defined in terms of current differences in child-rearing beliefs between children and their parents. Most studies from the 1960s and 1970s were based on the latter approach.

Generation gaps emerge out of the differential experiences of what demographers refer to as *birth cohorts*. Birth cohorts are groups of individuals born

within a similar time, typically 10-or 20-year intervals. Typically, cohort members have *unique* experiences that affect their human development in similar ways. This uniqueness of birth cohorts is linked directly to the level of social change within a given society. The greater the degree of social change (i.e., immigration, economic development, political instability), the more unique birth cohorts become. Thus, the characteristics of birth cohorts influence generation gaps in two key ways. First, they emphasize the distinctiveness of different birth cohorts. Second, through shared experiences and memories, members of the same birth cohort form deep bonds with each other, often reinforcing that which makes them unique to other generations.

What are the implications of the generation gap? At the family level, generation gaps may increase ambiguity and discord between parents and their children. At the societal level, researchers and policy makers are concerned that increased parent-child discord may potentially alienate aged parents from their families, essentially making them more dependent on governmental sources of support in old age.

As our population ages and as the nuclear family continues to undergo radical transitions, there has been a renewed interest in the generation gap. This interest has been translated into the development of intergenerational programs that are aimed at reducing divisions and ambiguity between generations. Intergenerational programs are most frequently found in schools, child and adult day care programs, community centers, and civic organizations and youth groups, but federal and state initiatives also exist. However, we still do not know how effective these programs and initiatives have been on larger social and cultural processes that produce the generation gap.

—Adam Shapiro

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GENOTYPE

The term *genotype* refers to the specific genetic makeup, unique genetic constitution, or hereditary "blueprint" of an organism. An individual's genotype is his or her genetic identity.

A genotype can mean the full complement of genes that an organism possesses, or it can refer to the DNA bases at only one position in the genome. Often the term is used to describe a characteristic subset of genes, and the linkage relationships between them, that define an individual or group of individuals.

The term *allele* refers to the specific string of base pairs (i.e., the genotype) at a particular genetic locus. A *locus* is the physical position or address in the genome that a particular gene occupies. The term genotype may refer to the sequence of bases at a single locus (i.e., an allele), or it may refer to an organism's entire set of alleles.

The term *polymorphism* means the existence of two or more different forms in a population. In biology, its uses include describing variable forms of proteins or other chemical compounds, whole organisms, and genotypes. Genetic polymorphisms may be differences in single nucleotides, or they may extend over a number of nucleotides, examples being polymorphic repeat sequences. Polymorphism frequencies may vary in different subsets of the population. Common polymorphisms are most useful in mapping studies. Single nucleotide polymorphisms (SNPs) probably occur every several hundred base pairs in the human genome. With current technology, SNPs are found at about every 1,000 base pairs.

An individual may possess two copies of the same allele on both homologous chromosomes and be a homozygote or homozygous. An individual who carries two different alleles at a particular locus is a heterozygote or heterozygous. Strictly speaking, any difference in base pairs (i.e., genotype) between two alleles at a particular locus is heterozygosity. Sometimes the concept is used to signify only differences that lead to different gene products with significantly different functional capabilities. An example would be an individual who is heterozygous for a disease-causing mutation. On the other hand, a single base pair difference that occurs commonly and does not have any detectable effect on the gene product and/or its function (i.e., a polymorphism) also may define a

heterozygote. Such an individual would be heterozygous for a genetic polymorphism.

A group of two or more linked genotypes is called a *haplotype*. A haplotype may refer to a series of polymorphisms within a single gene, but more commonly, it refers to a series of genes or alleles that extend over a portion of a chromosome (i.e., genotypes at linked loci). Whereas allele refers to a particular genotype at a single gene locus, haplotype refers to a series of genotypes over a stretch of DNA that may include several genes. When a haplotype (i.e., a series of linked genotypes) tends to be inherited intact more often than expected, given its chances for recombination, it is said to be in *linkage disequilibrium*. Haplotypes, as well as single polymorphisms, are useful genotypes for mapping studies.

An organism's genotype is commonly thought to determine its outward characteristics (i.e., the phenotype). The fact is, however, that individual phenotypes actually result from not only the products of gene expression (i.e., the genotype as expressed through transcription and translation) but also complex interactions involving the environment and chance.

—Arthur S. Aylsworth

See also Phenotype

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GERONTOLOGICAL SOCIETY OF AMERICA

The Gerontological Society of America (GSA) was founded in 1945 to promote scientific study of aging and to encourage exchange of the resulting knowledge among scientists, teachers, practitioners, and decision makers in an aging society. GSA was the first scientific organization in the United States to promote a distinctive interdisciplinary focus on the study of human aging, a focus that continues to be reflected in its major journals—the *Journal of Gerontology*: *Psychological and Social Sciences* (published monthly); *Journals of Gerontology: Biology and Medical Sciences*, and *Gerontologist*, which focuses on applied research and policy issues (published bimonthly).

GSA maintains a membership of more than 6,500, and its annual meetings attract more than 3,500 participants in its interdisciplinary scientific programs. A special Committee on Humanities and Arts has broadened GSA's scope in recent years. Information about GSA's objectives, special events, and annual scientific programs is available on the Web at http://www .geron.org.

Although GSA historically attracted primarily academic scholars and investigators in gerontology, the organization has maintained an interest in promoting sound gerontological practice and in translating scientific information into effective social policies. Since 1960, an Emerging Scholar and Professional Organization program has promoted and facilitated development of careers in gerontology. In 1974, GSA leadership responded to a new federal initiative in aging, the Older American's Act, with the creation of what became the Association for Gerontology on Higher Education (AGHE). AGHE focused on training materials and programs designed primarily for smaller academic institutions and initially worked independently before reintegrating administratively with GSA in 1999. AGHE provides more than 350 member institutions consulting service for developing programs promoting careers in gerontology; guidelines for developing training programs; a national directory of training programs; surveys assessing the effectiveness of career training programs in aging; and a broad range of training materials. AGHE's annual meetings showcase current information on key issues in effective promotion of careers in gerontology. Current information on AGHE's services, publications, and annual meetings is available at http://aghe.org.

GSA has issued over the years a number of timely publications addressing issues of gerontological research, education, and public policy and for more than two decades has conducted a postdoctoral research training program for younger academics with career interest in aging. In the 1970s, GSA also

provided summer research training institutes for college and university faculty. From time to time, GSA administers foundation-supported fellowships in special areas, such as research in biomedicine and social work.

GSA has continually related scholarship and research on human aging to assessment of alternative policies for an aging society. The society is a founding member of the Leadership Council of Aging Organizations, a coalition of more than 40 national aging organizations that meets regularly to review the status of aging policies and to recommend national strategies. GSA's policy institute, the National Academy on an Aging Society (NAAS), was established in 1994 to add a new dimension to GSA's interest in aging policies. NAAS conducts research identifying challenges and opportunities in an aging society and presents policy-relevant findings from research to the public, the press, and policy makers. Published reports, research briefs, and fact sheets are made available to the press and Congress. NAAS's *Public Policy and Aging Report* is distributed regularly to more than 2,500 policy makers, investigators, and members of the media. Effective ways to promote civic engagement in the interest of moving aging issues onto the civic agendas of communities is an example of the NAAS's initiatives. For information about NAAS research and publications, see http://agingsociety.org.

GSA is a founding member of the International Association of Gerontology (IAG), an organization that brings together every 3 years scholars, scientists, and practitioners in gerontology and geriatrics from more than 50 countries worldwide. IAG has played an important role in advising the United Nations and periodic World Congresses on Aging on aging issues in both more developed and less developed countries. The presidency of IAG, which rotates among participating countries every 3 years, was the responsibility of GSA leadership from 1982 to 1985; in 2005, IAG leadership is from Canada. For current information on activities and plans for the next international congress, visit http://sfu.ca/iag.

—George L. Maddox

See also Gerontology

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National Academy on an Aging Society, http://agingsociety.org

GERONTOLOGY

From the time of conception onward, humans are constantly aging, developing, and getting older. Although not a new area of investigation and study, gerontology (operationally defined as the scientific study of the aging process) has until recently taken a back seat to many other areas of scientific investigation. One reason for this is that many individuals do not want to think about aging and getting older, although these processes are inevitable. However, the study of aging and gerontology (as well as geriatrics) has taken center stage within many areas, including biology, psychology, sociology, and education, among others. Questions about how we age, why we age, why some age faster (or slower) than others, and diseases and deficits associated with aging and gerontology are now issues of vast importance worldwide. Related issues concern quality of life as we age, nursing home placement, and therapeutic interventions to slow down or halt the aging process to name but a few. Gerontology is now a "hot" topic and one worthy of continued investigation. One need only consult sources on sociological and demographic information to realize that people are living longer and that with this increase in longer life comes more risk for age-related disease and disorder. Understanding the aging process (gerontology) is of critical importance on many levels.

WHAT IS GERONTOLOGY AND WHY SHOULD WE STUDY IT?

As mentioned previously, gerontology is considered the scientific study of aging and the aging process. As with many English words, the derivation comes from Greek, with *ology* meaning "the study of" and *gero* meaning elders. A similar, but different, term is *geriatrics*, which is typically referred to as a specialty area of study within various health care fields (e.g., social work, medicine). Gerontology is multidisciplinary, with many areas contributing to its knowledge base, including psychology, sociology, education, social work, and medicine. The multidisciplinary nature of gerontology makes good sense because to understand gerontology and aging is to reveal how several of these areas interact with each other and influence how and why we age. Several theoretical views of aging and gerontology also advocate this interactive nature of the aging process, suggesting that gerontology is best viewed from several

different contexts (historical, cultural, societal). For these reasons, gerontology has becomes one of the fastest growing areas of study in the United States and, more important, the rest of the world.

WHAT FACTORS HAVE INCREASED THE POPULARITY OF GERONTOLOGY?

Radical changes have been slowly evolving with regard to aging and gerontology, and these changes relate to several factors, including dramatic increases in the proportion of older adults older than 65, a lowered birth rate, advances and increases in how long a person can live (life expectancy), and the graying of the current baby boomers. Because of these (and other) factors, it is estimated that within the next 20 to 25 years, about 1 in every 4 older adults will be 65 years of age or older. Additionally, one of the faster growing segments of the population is the so-called old-old, those individuals 85 years of age and older. In fact, another fast-growing group is those who live to be 100 and beyond (the so-called centenarians). Because women historically tend to outlive men, these increases will be especially relevant for women as they get older. One downside of such longevity is the undeniable fact that age is the number one risk factor for several age-related diseases and disorders, including Alzheimer's disease. It is estimated that 50% of individuals age 85 and older have some form of Alzheimer-type dementia. The paradox, then, becomes what to do with an advancing aging population that shows increased risk for a number of age-related diseases and disorders. Adequately addressing and dealing with this paradox is precisely where gerontology fits in to the larger picture of aging and geriatrics.

THEORETICAL ISSUES IN GERONTOLOGY

Like any science, gerontology is rooted in and driven by a number of theoretical issues that highlight the somewhat controversial nature of the aging process. These controversies exist because there is no one crucial factor or variable that causes aging and gerontology. In fact, some argue that the aging process is akin to a disease, whereas others argue that aging and gerontology are normal processes. Because of the interactive nature of aging and gerontology discussed earlier in this entry, it is not surprising that such controversies exist. Although some would argue that such controversies are not healthy for the study of aging and gerontology, in fact it is precisely these controversies that are making the scientific study of aging more of an accepted discipline worthy of continued study. One such theoretical view that has shown continued popularity is the life span model of aging. It is this model that accurately outlines aging and gerontology as a contextually dependent and highly interactive series of stages or processes that result in aging. The life span model posses seven distinct criteria—that aging and development are lifelong, multidimensional, multidirectional, plastic, multidisciplinary, and contextual, and include issues in growth (gains) as well as decay (losses). This theoretical model has been the dominant view in aging and gerontology for the past 20 years and shows no signs of decreasing in its popularity with a variety of researchers, teachers, and doctors.

HOW DO YOU STUDY GERONTOLOGY?

Like any other science, several methodologies and statistical techniques are available for the study of aging and gerontology. The two most typical methodologies used in aging and gerontological research are the cross-sectional and longitudinal methods. Both have costs and benefits, and the type used is actually related to what specific hypothesis (or hypotheses) a researcher is interested in. For instance, many gerontology studies (typically) compare a group of young adults (usually ages 18 to 22) and a group of older adults (usually age 65 and older) on some series of tests or experimental manipulations. This cross-sectional method is efficient and less time consuming than the longitudinal method and is frequently used. However, the issue of cohort effects is always potentially confounding because these types of designs are not good at controlling for these effects. Longitudinal studies are more cumbersome to complete, especially because the researcher is testing the same person (or persons) over an extended period of time (usually years). Problems like subject attrition, subject death, and cost are usually factors that prevent researchers from using a longitudinal type of methodology. However, similar problems exist for the longitudinal methodology as well, and confounding cohort variables are also possible. Sequential research designs, however, are possible alternatives to cross-sectional and longitudinal methods, and the age cohort effects can be teased apart. One method is not better than another, and it is primarily up to the investigator to decide which methodology offers the most

benefit with the least amount of cost. Some of the most prominent and classic studies in gerontology, however, are longitudinal studies and include the Baltimore Longitudinal Study of Aging and the Seattle Longitudinal Study of Adult Intelligence.

SUMMARY AND FUTURE DIRECTIONS

This brief review has highlighted what gerontology is, how it is studied scientifically, and what these results mean in the grand scheme of things. However, the current status of aging and gerontology also begs the question of what the future holds for these topics and their associated challenges. First, the issue of dramatic increases in the numbers of older adults diagnosed with Alzheimer's disease (and other age-related disorders) will need careful (and immediate) attention. Training more professionals in the areas of aging and gerontology will be a priority in the coming decades across a number of disciplines. Likewise, and somewhat related, are how attitudes and perceptions of age and aging can be changed to a more positive view. Older people face discrimination, ageism, and prejudice all because of their age. This is especially problematic for older women and older women of color. This negative view is not universal, and it may be possible to integrate the more positive aspects of aging from other cultures into ours. These are the challenges posed by the field of gerontology and are challenges that can and should be taken up by the current and future generations of gerontological scholars who study, examine, and interpret the vast age differences and age similarities that exist.

—F. Richard Ferraro

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GESELL, ARNOLD (1880–1961)

Arnold Lucius Gesell was among the first psychologists to establish quantitative measures of child development, based on his extensive observations of New Haven children, whom he filmed through one-way mirrors in the laboratory. Born 1880 in Alma, Wisconsin, a small town that still refers to him as the most famous graduate of Alma High School, Gesell in 1899 graduated with a bachelor's degree from Steven Point Normal School. In 1906, he earned his PhD from Clark University, specializing in child development under his mentor G. Stanley Hall (1844–1924). After earning his PhD in psychology, Gesell worked briefly in an elementary school before taking up the post of assistant professor at Yale University in 1911. There he founded the Yale Clinic of Child Development. At the age of 30, Gesell decided to study medicine, and in 1915, he received his MD from Yale University.

Using his observational studies, Gesell established developmental norms from birth to adolescence. These scales were not measures of Intelligence Quotient (IQ); rather, they described behaviors in four areas: personal-social, neurological-motor, language development, and overall adaptive.

The primary aim of Gesell's Developmental Assessment was to observe children's overall behavior in order to compare their developmental level with their chronological age. These assessment scales were used to assess children's school readiness and to identify abnormal patterns of development that might necessitate further investigation. Gesell was also influential in adoption issues. Gesell believed that adoption posed a risk or was inappropriate for some children. He therefore advocated the use of his scales to determine whether children were suitable for adoption and to match their abilities to the abilities of the prospective adoptive parents.

The basis for Gesell's theory of child development is rooted in the principle that development is influenced by two factors, the environment and genes, and that although development unfolds in a fixed sequence, the rate of development varies. Hence, he believed that children can only be taught a skill once they are ready for it and that each child is a unique individual and so cannot be classified on the basis of chronological age alone; rather, children have to be examined in the context of their sociocultural background. Gesell was aware

of, and often referred to, the fact that children's development needs to be assessed by examining various sources, such as cultural or social influences and observations by teachers, as well as taking into account measurements carried out in his laboratory. Nevertheless, he was criticized for the fact that the norms that he established were based usually on white middle-class children from well-educated backgrounds. Additionally, Gesell's use of the concept of "normality" was criticized. It was considered too imprecise in that children who performed below established norms were still "normal," according to Gesell, but just slower in their development. He wrote and coauthored many books and chapters, which are still in use today.

—Nadja Reissland

See also Maturation

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GIFTEDNESS

Giftedness can be conceived as unusually high ability or potential in any domain. Views of giftedness are culturally shaped, and society deems which domains are recognized, valued, and nurtured. Historically, the term *gifted* was primarily applied to high intellectual abilities, although it has also been applied to high ability in areas such as the arts. From a psychometric perspective, the term gifted refers to performance at 2+ standard deviations above the mean on an IQ test (130 or 132 IQ). IQ tests are intended to measure verbal abstract reasoning, logical-mathematical reasoning, and general knowledge, as well as certain types of social awareness and spatial abilities. Unintentionally, they also measure such things as test-taking skills, self-efficacy, and the effects of the testing situation.

IQ tests have been criticized because they evaluate a narrow range of human abilities. Many theorists assert that giftedness should also be recognized in additional areas, such as creativity, task commitment, "street smarts," interpersonal skills, and so on. The Marland Report informed the U.S. Office of Education's definition of giftedness (P.L. 97–35). Six areas were targeted: general intelligence, specific academic aptitude, creative thinking, leadership ability, visual and performing arts, and psychomotor ability. Across these domains, the defining characteristic of giftedness is extraordinary potential or performance.

Teacher recommendations, academic achievement, and behavioral checklists are commonly employed methods of screening students for gifted programs, and most gifted programs include IQ tests as part of their strategy for identifying participants for gifted programs. Recently, new methods of recognizing giftedness have emerged to complement these traditional methods. For example, alternative approaches to the use of portfolio evaluation and dynamic assessment have been proposed as methods that show promise for addressing a serious problem plaguing gifted education: the underrepresentation of certain minority groups in gifted programs. Instead of simply measuring the products of learning, both of these methods evaluate the processes of new learning.

How giftedness is defined matters. It has implications for the identification and selection of students for programs. It also determines the scope and character of gifted programs.

EDUCATION OF GIFTED STUDENTS

In his 1972 report to Congress, Marland asserted that if they are to attain their potential, gifted children need educational programming that goes beyond what is provided in the regular classroom. More than 20 years later, another U.S. Department of Education report described the state of gifted education as being in a crisis. Misplaced perceptions of egalitarianism may underlie the slow progress many schools have made toward developing and implementing successful gifted programs.

A survey of teachers documented the practices employed in the education of gifted students. These included acceleration, or increasing the rate at which students progress through material; enrichment, or increasing the depth and breadth of students' knowledge base; using various student grouping practices; and independent work. In addition, individualized instruction such as private tutoring, distance learning, and home schooling are noted in the literature on gifted education.

The most successful gifted programs employ differentiation, individualization, and teachers trained in giftedness. Differentiation refers to curricula that are suited specifically to how gifted students learn. Although differentiation can be provided within the regular classroom in theory, in practice, little or no real differentiation seems to occur in most such situations.

Most agree that gifted students benefit intellectually, and without social detriment, from accelerated learning opportunities. However, the research on enrichment-based program outcomes is mixed. Gifted students may benefit from independent projects and the like, but given the opportunity, might prefer working with other gifted students rather than working in isolation. Mixed-ability grouping practices, which are effective for many students, may not serve gifted students well. From both an academic and a social perspective, placing gifted students together is the preferred method of grouping for this population. Although it is not as effective as grouping gifted students together in separate classes or schools, from an achievement perspective, pull-out gifted programs are better than within-class gifted programming. Many pull-out programs employ generic enrichment models, however, and fail to individualize curricula. Like their counterparts enrolled in special education, gifted students, especially highly gifted students, have special needs that may be best addressed in a case-by-case manner.

Not all gifted children show gifted performance in the typical school setting and may fail to achieve at levels commensurate with their abilities. Gifted children can become disenfranchised, hide their giftedness, underachieve, or dedicate their energies to socially acceptable activities, such as athletics. To avoid such negative consequences, gifted children need both to be challenged and to be around like-minded peers. Without sufficient opportunities to interact with other gifted children, these children can feel very "different" from their classmates and very alone.

SOCIAL AND EMOTIONAL ISSUES

In general, the gifted have fewer mental health problems than most. This advantage may not apply to some subgroups. For example, those who are exceptionally gifted in verbal ability, creativity, or the arts may suffer disproportionally from mood disorders and problems with self-esteem.

Gifted children's self-concepts are generally at average or above-average levels. Their high *academic* self-concept may be in part responsible for these findings. Gifted children's *social* self-concept scores are not generally found to be similarly enhanced.

Gifted students tend to have good social relations but may have distinct perceptions concerning their relationships and social status. They may not be as satisfied with their peer relationships, even when from the outside those relationships seem positive. With extreme ability, problems can arise from not being synchronized with peers. The extremely gifted choose to spend a great deal of time alone and may be inclined toward introversion or isolation. Indeed, the extremely gifted may feel extremely lonely.

Giftedness, for some, is a social liability. They feel they cannot be themselves and must hide their gifts. Gifted children also perceive themselves as *different* from others and feel that others treat them differently and see them as different. Feeling different can include both positive factors, such as being curious and capable, having additional resources, and feeling proud, as well as some negative factors, such as feeling isolated and feeling out of step with one's peers.

Although gifted individuals feel things very deeply, their emotional intensity is not associated with adjustment problems. Young gifted children have a passion for their domains of ability. Being inclined towards perfectionism, the gifted often expect a great deal of themselves. Others, too, expect a great deal from them. These children may be given the message that they should do extraordinary things (which rarely happens)—and if they don't, they are somehow failing.

The adults in the lives of gifted children need to be sensitive and responsive not only to their educational needs but also to their social-emotional needs. Although some gifted subgroups, such as the extremely gifted, may be at increased risk for adjustment problems, in general, the gifted are well adjusted. Gifted children, nevertheless, have some atypical responses and face some unique social-emotional challenges.

SUMMARY

Gifted individuals are, by definition, exceptional owing to having extraordinary abilities. Regardless of the domain of their giftedness, they have atypical needs. They need differentiated and individualized education provided by trained teachers, and they need opportunities to work and play with other gifted children.

—Catya von Károlyi

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GILLIGAN, CAROL (1936–)

Born in New York City, Carol Gilligan is a full professor at New York University in the School of Law and a visiting professor at the University of Cambridge affiliated with the Centre for Gender Studies.

Gilligan received a bachelor's degree in English literature at Swarthmore College, a master's degree in clinical psychology from Radcliffe College, and a PhD in social psychology from Harvard University in 1964. She began teaching at Harvard in 1967 and worked with both Erik Erikson and Lawrence Kohlberg. While studying with Kohlberg, Gilligan became interested in his research on moral development. In the next few years, she conducted studies that led to her seminal work, *In a Different Voice: Psychological Theory and Women's Development* (1982), which described women's point of view on development in terms of their caring effect on human relationships. Her studies on women and gender issues resulted in five coauthored books with her students: *Mapping the Moral Domain* (1988), *Making Connections* (1990), *Women, Girls, and Psychotherapy: Reframing Resistance* (1991), *Meeting at the Crossroads: Women's Psychological and Girls' Development* (1992), and *Between Voice and Silence: Women and Girls, Race and Relationships* (1995). *Meeting at the Crossroads: Women's Psychological and Girls' Development* won the *New York Times'* Notable Book of the Year award. In addition to being a prolific author, Gilligan has been honored by receiving a Senior Research Scholarship award from the Spencer Foundation (1989–1993), a Grawemeyer award for her contributions to education (1992), and a Heinz award for contributions to the field on human conditions (1998), and was named one of the 25 most influential Americans by *Time* magazine.

Gilligan was a member of the Harvard faculty for more than 30 years and was named the first Professor of Gender Studies in 1997, where she was the Patricia Albjerg Graham chair. While still a professor at Harvard, she was honored with the distinction of becoming the Pitt Professor of American History and Institutions at the University of Cambridge (1992–1993). In 2002, she became University Professor at New York University, where she continues to work. Also in 2002, her book *The Birth of Pleasure* was described by *The Times Literary Supplement* as a "thrilling new paradigm." Gilligan teaches courses on gender issues, psychology and culture of democratic societies, and adolescent psychology.

—Joyce Burstein

See also Moral Development, Moral Reasoning

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GILLIGAN'S THEORY OF FEMININE MORALITY

Carol Gilligan was born on November 28, 1936, in New York City. She graduated from Swarthmore College in 1958, majoring in literature. She received her Masters in clinical psychology in 1960 from Radcliffe University and her PhD in social psychology from Harvard University in 1964. She began teaching at Harvard in 1967, becoming a full professor there in 1986.

Gilligan's primary focus was the moral development of young women. In 1970, she became a research assistant for Lawrence Kohlberg, whose stage theory of moral development is now well-known. Gilligan's interest in moral development was deeply affected by her interviews with young women contemplating abortions in the 1970s.

Over time, Gilligan began to question Kohlberg's methodology and the assumptions that grounded his theory. First, the participants in his studies were all privileged white men and boys. Gilligan felt that this biased his theory against women. Second, Kohlberg privileged the consideration of individual rights and rules over the consideration of the importance of caring in human relationships. Gilligan took this to represent the privileging of a male perspective over a female perspective.

Research by Constance Holstein (1976) appeared to support Gilligan's claim that there is a gender bias in Kohlberg's theory. Holstein's longitudinal study found that female participants typically scored at stage 3 of Kohlberg's moral stages (which emphasizes interpersonal relationships and issues of social duty and obligation), whereas male participants typically scored at stage 4 (which emphasizes abstract issues of rights, laws, and social contracts). According to these results, males are generally more morally developed than females. However, Gilligan argued instead that these results show that Kohlberg's stages are unfairly biased in favor of the kind of moral reasoning in which males, but not females, typically engage.

Consequently, Gilligan became one of Kohlberg's most outspoken critics. Her criticisms of Kohlberg's theory were published in her 1982 book, *In a Different Voice: Psychological Theory and Women's Development,* which Harvard University Press described as "the little book that started a revolution." Translated into 17 languages with more than three-quarters of a million copies sold, it continues to inspire political debate, new research, and initiatives in policy and education. *In a Different Voice* was followed by several other coauthored or edited books: *Mapping the Moral Domain* (1988), *Making Connections* (1990), *Women, Girls, and Psychotherapy: Reframing Resistance* (1991), *Meeting at the Crossroads: Women's Psychology and Girls' Development* (1992), and *Between Voice and Silence: Women and Girls, Race and Relationships* (1995).

REVIEW OF KOHLBERG'S MORAL STAGES

In 1969, Kohlberg published his stage theory of moral development. He argued that moral development occurs through a series of invariant stages, in a manner similar to Jean Piaget's cognitive development stages. Kohlberg's model is not only descriptive of how moral development occurs, but also prescriptive of how moral development *should* occur. Insofar as each stage represents a higher level of moral reasoning (i.e., a stage that is more adequate, stable, and "ideal"), people should strive to attain the highest stage of moral development.

Kohlberg identified three levels of development with six stages, two stages per level, as follows:

Level 1—Preconventional (concrete individualistic perspective): stages 1 to 2

Level 2—Conventional (member-of-society perspective): stages 3 to 4

Level 3—Postconventional (prior-to-society perspective): stages 5 to 6

Although Kohlberg's stages vary in what factors are salient to people engaged in moral reasoning, each stage involves what Kohlberg called "justice reasoning."

Thus, each stage of development revolves around how best to adjudicate interpersonal conflicts, balance conflicting claims and competing interests, and most fairly distribute goods and rights (the "benefits and burdens" of social life).

GILLIGAN'S THEORY OF FEMININE MORALITY

Gilligan challenged Kohlberg's claim that all moral reasoning is "justice reasoning." She argued that Kohlberg's stage theory makes assumptions—for example, that the moral ideal is attained through an abstract, impersonal, individualistic "prior-to-society" perspective—that do not respect the experiences of women, who prioritize interpersonal relationships. Kohlberg's theory thus estranges women from the process of moral development.

Gilligan argued that women's moral judgments necessarily include feelings of compassion and empathy for others, as well as concern for commitments that arise out of relationships. Women engage in "care reasoning," not "justice reasoning," and thus consider their own and other's responsibilities to be grounded in social context and interpersonal commitments.

Gilligan identified two moral voices that arise from two distinct developmental pathways. According to Gilligan, the male voice emphasizes independence ("separation") and responsibility for oneself, whereas the female voice emphasizes interdependence ("connection") and responsibility to others. Males are encouraged to be active agents, females to be passive recipients. When faced with moral problems, males seek solutions that are just and fair; females seek solutions that are caring and benevolent. For males, moral wrongness is linked to the violation of rights and justice; for females, moral wrongness is linked to a failure to communicate and to respond. For males, moral interactions take place primarily at the political and legal level, in the realm of abstract laws and social contracts; for females, moral interactions take place primarily at the level of personal relationships, in the family and the social network of the community in which they live.

Like Kohlberg, Gilligan identified several stages of moral development.

Level 1: Self-Oriented

Focus is on the needs of oneself. Here, the survival of oneself is of sole concern. The transition to level 2 begins with the recognition of the conflict between one's own needs and the needs of others (i.e., what one owes to oneself vs. what one owes to others).

Level 2: Other Oriented

Focus is on the needs of others. Here, the self adopts the traditional conception of feminine goodness, the maternal morality of self-sacrifice, whereby the good is equated with caring for others. Consequently, one's own needs become devalued. The transition to level 3 begins with the recognition that the self cannot be left out, but must also be an object of one's caring.

Level 3: Universal Oriented

Focus is on the universal obligation of caring. Here, care is a self-chosen principle that condemns exploitation, violence, and neglect and demands active response to suffering. Caring for oneself and others is seen as intertwined because the self and others are recognized as interdependent. Thus, all acts of caring are seen as beneficial to both self and others.

EVIDENCE FOR GILLIGAN'S THEORY

Nona Lyons (1983) interviewed 36 people using real-life moral dilemmas. Responses were coded as either "rights" (justice) oriented or "response" (care) oriented. Three fourths of female respondents displayed the response orientation, whereas only 14% of male respondents displayed this orientation. On the other hand, 79% of male respondents displayed the rights orientation, whereas only 25% of female respondents displayed this orientation.

Gilligan and Attanucci (1988) found that 65% of males used a justice-only orientation, 32% used a justice and care mixed orientation, and none used a care-only orientation. In contrast, 35% of females used a care-only orientation, 35% used a justice and care mixed orientation, and 29% used a justice-only orientation. Gilligan and Attanucci concluded that both men and women can use justice and care orientations, but men tend to gravitate toward a justice orientation, whereas women tend to gravitate toward a care orientation. They further concluded that women appear to be more willing (or able) to use a justice orientation than men are willing (or able) to use a care orientation.

As further evidence for her theory, Gilligan pointed to the overwhelmingly male population of the prison systems and the preponderance of women in educational

and caretaking professions. Rhetorically, she asks: if there are no gender differences in empathy and moral reasoning, then why are there such easily recognizable gender-specific behavioral differences?

CRITICISMS OF GILLIGAN'S THEORY

Some argue that Holstein's study failed to provide unequivocal evidence for gender bias because, although some results did suggest a gender bias, other results did not.

Indeed, Gilligan's claim that Kohlberg's theory is gender biased has found little empirical support. Lawrence Walker's (1984) empirical meta-analysis found that gender differences in moral reasoning stages are extremely rare: of 108 studies, only 8 showed clear gender effects, many of which were confounded by educational levels or occupational status. Likewise, James Rest's (1979) meta-analysis also found that gender effects are extremely rare. Also, Walker (1989) found that most of the gender effects that have been reported are nonsignificant.

Kohlberg's response to Gilligan's critique was to distinguish between two different ways of thinking about morality. Morality is sometimes concerned with what it takes for a judgment to be moral (i.e., whether or not it is impartial, universal, and prescriptive; whether or not it is motivated by a desire to adjudicate conflicts, and so on). However, morality is also sometimes concerned with human relationships and what they must include to be moral (i.e., whether or not they involve adequate concern for another's well-being; whether or not they are motivated by feelings of obligation and responsibility, and so on). These are two ways of *thinking about* morality, Kohlberg argued, not two different moralities. Consequently, he proposed a moral continuum that possesses a justice orientation at one end and a caring orientation at the other.

—Jennifer Cole Wright

See also Moral Development

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GLASS CEILING

The term *glass ceiling* was introduced in the 1980s to refer to an informal but effective limit on how high women could rise in a work organization. This ceiling was "glass" in that women could see above this transparent barrier, and in fact might not realize it was there, until they found they could go no higher. This ceiling is understood to apply to women as a group who are kept from advancing not because of their individual deficiencies, or because of the funnel of fewer opportunities at higher levels, but *because they are women*. When the Federal Glass Ceiling Act was passed by Congress in 1991, the term was expanded to refer to artificial barriers that prevent the promotion of women or minorities; in current usage, it may refer to limitations on women or people of color. More precisely, a glass ceiling is indicated by a disproportional lack of advancement that cannot be accounted for by productivity and that increases at higher organizational levels.

Support comes first from data showing underrepresentation at high organizational levels in proportion to presence in the workforce. For example, although women constitute about half the managerial workforce, Catalyst's survey in 2000 showed that only 12.5% of

the top corporate officers in Fortune 500 companies are women. At the very top levels—chairman, CEO, president, or executive vice president—only 6.2% are women. In 2003, Catalyst reported that only 13.6% of the directors of these large companies were female, but this was an overestimate of numbers because often the same individual was appointed to more than one board. Most of the 500 companies had *at least one* woman on their board, but 54 had *no women*.

Additional support for the concept comes from longitudinal sociological analyses. D. J. Maume has shown increasing disadvantage in advancement for women and minorities over time when productivity is taken into account.

In the early 1990s, the Department of Labor published a report on the glass ceiling. Subsequently, Title II of the Civil Rights Act of 1991 ("The Glass Ceiling Act") set up the Glass Ceiling Commission. This 21-member bipartisan body was charged with studying the glass ceiling and making appropriate recommendations "to eliminate artificial barriers" . . . and "increase opportunities and developmental experiences of women and minorities."

Its 1995 report identified barriers at three levels. In *society at large*, the "supply barrier" of lack of opportunity and the "difference barrier" of stereotypes and bias were noted. *Government barriers* included lack of vigorous and consistent monitoring and law enforcement, weaknesses in the collection of employment-related data, and inadequate reporting of glass ceiling issues. Barriers *internal to business structure* included inadequate outreach and recruitment, hostile or unsupportive corporate climates, and problems in moving women and minorities through the internal pipeline to upper management.

The Commission's final report recommended several things that could be done by government and business. The Federal government should lead by example and improve data collection for tracking the progress of underrepresented groups. It should more strongly enforce antidiscrimination laws and develop ways to make demographic statistics currently being collected by federal agencies publicly available on a voluntary basis. Recommendations to business included demonstration of CEO commitment to workforce diversity. Businesses should include diversity in all business plans and hold managers accountable for meeting advancement goals for underrepresented groups, committing to affirmative action as a tool in this process. Women and people of color should be actively prepared for senior management positions and the corporate workforce should be educated about glass ceiling issues. Family-friendly work-life policies are needed, as well as high-performance workplace standards to encourage autonomy and initiative in all employees.

—Rosemary Hays-Thomas

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GRADE RETENTION

Grade retention, also recognized as "being retained," "being held back," "nonpromotion," and "flunking," refers to the practice of requiring a student who has attended a given grade level for a full school year to remain at that same grade level in the subsequent school year. The practice of grade retention has become increasingly popular over the past few decades and particularly amidst the current sociopolitical zeitgeist emphasizing educational standards and accountability. In contrast to the abundance of research during the past century suggesting that grade retention is an ineffective and discriminatory policy, grade retention rates have increased during the past 30 years.

Current estimates indicate that between 7% and 9% of children in the United States are retained annually,

resulting in more than 2.4 million children every year. Considering the research investigating the effectiveness of grade retention as an intervention to address academic, social-emotional, and behavioral problems, the increasing use and expense in the United States has led to numerous debates. Research provides essential information regarding (1) individual, family, and demographic characteristics of retained students; (2) the effectiveness of grade retention in addressing academic, social-emotional, and behavioral problems; (3) long-term outcomes associated with grade retention; and (4) the perceived stressfulness of grade retention from students' perspectives.

CHARACTERISTICS OF RETAINED STUDENTS

Research has examined gender and ethnic characteristics of retained students, revealing that boys are twice as likely to repeat a grade as girls and that retention rates are higher for minority students, particularly African American and Latino children. Retained students generally have lower achievement scores relative to the average student in a classroom; however, it is important to consider other characteristics of retained students because low achievement in isolation is not a distinguishing characteristic among retained and promoted students. Compared with equally low achieving and promoted peers, research reveals that retained students do not consistently have lower IQ scores. However, children who are retained are more likely to have mothers with lower IQ scores than a matched group of promoted children. Moreover, parents' involvement in school and attitude toward their child's education also play a significant role in determining whether a student will be retained.

Those students who are retained are often reported as being significantly less confident, less self-assured, less engaging, and more "immature," and as exhibiting more behavior problems compared with their similarly low achieving, but promoted, peers. Teachers have also reported that the retained students are less popular and less socially competent than their peers. Thus, available research indicates that retained students are a diverse group of children with an assortment of challenges that influence low achievement, behavior problems, and poor classroom adjustment.

EFFECTIVENESS OF GRADE RETENTION

Comprehensive reviews and examinations of grade retention research published between 1925 and 1999 have provided a synopsis of the findings of this research. These comprehensive reviews inform researchers and practitioners alike of the overall, cumulative results of these grade retention studies. Examinations of these studies that result in a negative number indicate that an intervention (grade retention in this case) had a negative or harmful effect relative to the comparison groups of promoted students. The larger the negative number, the more harmful the intervention. These comprehensive reviews examining the effectiveness of grade retention have included academic achievement, behavior problems, and social adjustment.

Effects on Academic Achievement

Overall, research does not demonstrate academic advantages for retained students relative to comparison groups of low achieving promoted peers. One comprehensive review of 63 grade retention studies revealed that 54 yielded negative numbers with respect to the effect that grade retention had on achievement for retained students. Of 9 studies revealing positive short-term achievement effects (during the repeated grade the following year), the short-term benefits diminished over time and disappeared in later grades. The overall negative effects on achievement outcomes found in this comprehensive review was −.44. This number indicates that grade retention was not found to be a beneficial intervention, overall, in the studies examined.

The most recent comprehensive review of 20 studies, published between 1990 and 1999, revealed that only 5% of 169 analyses of academic achievement outcomes resulted in significant statistical differences that favored the retained students, whereas 47% resulted in significant statistical differences favoring the comparison groups of low achieving peers. Of the analyses that did favor the retained students, two thirds reflected differences during the repeated year (e.g., second year in kindergarten). Moreover, these initial gains were not maintained over time.

Analyses examining the effects of retention on language arts, reading, and math yielded moderate to strong negative effects (−.36, −.54, −.49, respectively). Notably, decisions regarding grade retention are often

based on reading skills; however, research reveals that grade retention appears to be an ineffective intervention to improve reading skills. Thus, grade retention appears be contraindicated for children with reading problems.

These findings indicate that across published studies, low achieving but promoted students outperformed retained students in language arts, reading, and math. Altogether, the results of comprehensive reviews examining more than 80 studies during the past 75 years, including nearly 700 analyses of achievement, do not support the use of grade retention as an early intervention to enhance academic achievement.

Effects on Social Adjustment and Behavior

Relatively fewer studies have addressed the social adjustment and behavioral outcomes of retained students. The results of these studies indicate that grade retention fails to improve problem behaviors and can have harmful effects on social-emotional and behavioral adjustment as well. A comprehensive review that examined more than 40 studies, including 234 analyses of social-emotional outcomes, concluded that, on average, the retained students displayed poorer social adjustment, more negative attitudes toward school, less frequent attendance, and more problem behaviors in comparison to groups of matched controls. Another comprehensive review examining 16 studies generated 148 analyses of social-emotional adjustment outcomes of retained students in comparison to a group of low achieving but promoted students. Based on this comprehensive review, retention was found to have an overall moderately negative average effect on the social adjustment and behavior outcomes of retained students. Related research reveals that retained students may be teased or have difficulties with their peers. Overall, results of comprehensive reviews of more than 300 analyses of social-emotional and behavioral adjustment (from more than 50 studies during the past 75 years) do not support the use of grade retention as an early intervention to enhance social-emotional and behavioral adjustment.

Long-Term Outcomes Associated With Grade Retention

There is a considerable amount of literature examining high school dropout that identifies grade retention as an early predictor variable. Grade retention has been identified as the single most powerful predictor of dropping out, even when controlling for other characteristics associated with dropping out. A comprehensive review of 17 studies that examined factors associated with dropping out of high school before graduation supports the findings that grade retention is one of the most robust predictors of school dropout. All studies of school dropout that included grade retention found that it was associated with subsequent school withdrawal. Several of these studies included statistical methods that controlled for many individual and family level variables commonly associated with dropping out (i.e., social-emotional adjustment, socioeconomic status, ethnicity, achievement, gender, parental level of education, and parental involvement). Research indicates that retained students are between 2 and 11 times more likely to drop out during high school than nonretained comparison groups of students and that grade retention increases the risk for dropping out between 20% and 50%.

In addition to increasing the likelihood of dropping out of high school, grade retention is associated with other long-term negative outcomes. The results of longitudinal research provide evidence that retained students have a greater probability of poorer educational and employment outcomes during late adolescence relative to a comparison group of low achieving but promoted students. Specifically, retained students are reported to have lower levels of academic adjustment at the end of 11th grade, are more likely to drop out of high school by age 19, and are less likely to receive a diploma by age 20. They were also less likely to be enrolled in a postsecondary education program, received lower education and employment status ratings, and were paid less per hour.

STUDENTS' PERSPECTIVES ON GRADE RETENTION

It is also important to consider children's perspectives regarding grade retention. In a study published in 1987, students in first, third, and sixth grade were asked to rate 20 stressful life events that included such occurrences as losing a parent, going to the dentist, and getting a bad report card. The results indicated that sixth grade students reported only the loss of a parent and going blind as more stressful than grade retention. This study was replicated in 2001, and it was found that sixth grade students rated grade retention as the single most stressful life event, higher than both the

loss of a parent and going blind. A developmental trend was noted in both studies, with the reported stress of grade retention increasing from first, to third, to sixth grade. Thus, research indicates that children perceive grade retention as extremely stressful.

SUMMARY

Cumulative evidence converging from research during the past century examining the effectiveness of grade retention consistently indicates the potential for negative outcomes. Considering this cumulative research evidence, it is important to consider evidence-based alternatives to promote the social and cognitive competence of children at risk for academic failure.

—Shane R. Jimerson and Sarah M. Woehr

See also School

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GRANDPARENTS

Multigenerational families have increased in number because of the extended life span of individuals. This increased longevity also has led to an increase in the number of older adults in our communities. Census reports of the past decade identify adults age 85 and older as the fastest growing population group. There has been an approximate 12% increase in the number of individuals age 65 years and older during the past decade. Predictions of continued growth among this age group over the next decade are attributed to the large number of baby boomers (those born from 1946 to 1964) who will turn 65 years old in the upcoming years.

Given the expansion in the numbers of older adults, the numbers of grandparents and even of great grandparents is expected to increase. In addition, the time spent in the grandparenting role and the likelihood of having adult grandchildren has also increased. An American Association of Retired Persons (AARP) study estimated that 56% of Americans 65 years and older have at least one adult grandchild. This figure is particularly striking when compared with data from two decades ago, when adolescents were unlikely to have known both of their grandparents. Today, 70% of older adults are grandparents. On average, grandparents are endowed with their new status at about age 45 years, but grandparents can range in age from 30 to 110 years old.

The lives of older adults and their progeny are inextricably connected and illuminated by today's changing family structures. Grandparents' entrenchment

in contemporary family structure has received the attention of the most recent U.S. Census. Multigenerational families tend to include grandparent, parent, and grandchild, with either the grandparent or parent having the responsibility as householder. There are 3.9 million multigenerational families in the United States (about 3.7% of all households). Although the definition of the multigenerational family encompasses householders who care for both their parents and children, in an estimated 2.6 million multigenerational families, the grandparents are the primary householders. Demographic factors such as increases in life expectancy, rates of divorce, and rates of remarriage contribute to changes in family structures and by extension changes in the very nature of the grandparenting role.

GRANDPARENTING ROLE

Grandparent is a term generally used to refer to one's ancestor. The term connotes caring, kindness, preservation of family values, and the like. Scholars lack consensus on the definition of the grandparenting role but agree that the role can be enacted in a variety of ways. The manner in which a grandparent assumes the grandparenting role is as diverse as the individuals holding the role.

During the preindustrial era, grandparents traditionally held roles of authority and high status in the family. Over the years, the grandparent role was influenced by societal changes, and the authoritarian role became less frequently held. Its absence was replaced with a more formal but friendly grandparent-grandchild relationship.

Older adults can simultaneously provide assistance to their offspring and play a meaningful role in their descendents' lives. The grandparent-grandchild relationship largely is devoid of the burden of parental responsibilities because grandparents often prefer to function as mentors and role models. A traditional classification of the grandparent role includes three dimensions: formal, fun seeking, and distant. Grandparents often opt for a fun-seeking (pleasurable) relationship with their grandchild.

The 20th century ushered in a new focus on the role of grandparents, highlighting its diversity and complexity. Grandparent roles vary according to geographic location and ethnic group membership. Furthermore, grandparents who live far away from their grandchildren are less able to offer instrumental assistance in terms of caregiving. They also visit with their grandchildren less often. Recently, grandparents have become a focus for anthropologists, sociologists, and other scholars in their efforts at understanding human evolution and behavior. For example, some studies attribute the decrease in mortality rate of toddlers (Gambia) and the increase in the fertility and life span of Kashi women (India) to the active roles of grandparents in those societies. Regardless of the pliability of the grandparent role and its susceptibility to sociocultural influences, the importance of grandparents seems to cut across class, ethnic, and cultural dimensions.

GRANDPARENT-GRANDCHILD RELATIONSHIP

The grandparent-grandchild relationship is unique because it is exempt from the emotional intensity and responsibility common to the parenting experience. Grandparents may relate to their grandchild on three dimensions: exchange of services, influence over grandchild, and frequency of contact. One classification of the grandparent's style of relating to the grandchild included the categories of (1) detached, (2) passive, (3) supportive, (4) authoritative, or (5) influential according to their level of involvement. Although the degree of involvement is low on all three dimensions for the detached styles (detached, passive, authoritative), a high level of contact with the child characterizes the influential and supportive styles. An example of the influential style is the active parent-like role (whereby grandparents provide caregiving assistance to parents and have frequent contact with the grandchild).

Another method of characterizing the styles of grandparenting focuses on different dimensions, including (1) centrality (role of grandparent is central in the grandparent's life); (2) valued elder (grandparent is the prized holder of tradition); (3) immortality through clan (grandparent's identification with grandchild as well as feelings of responsibility for family members); and (4) reinvolvement with personal past (reliving their own lives through their grandchildren).

Grandparenting styles have not escaped the purview of the emotional realm. Characterization of the grandparent-grandchild relationship has focused on measuring cohesion among the different generations of the family. Intergenerational relationships have been classified using six dimensions, including

(1) emotional closeness, (2) level of contact, (3) frequency of agreement, (4) importance of familial obligations to members, (5) geographic proximity, and (6) function helping behavior.

Scholars have also maintained that the grandparent-grandchild relationship is influenced by relational factors. Strained family relationships may impinge on the relationship between the grandparent and the grandchild. Relational quality between the parent and grandparent can determine the quality of the relationship between the grandparent and the grandchild. These intergenerational interactions are key because the parent brokers the initial grandparent-grandchild relationship.

Intergenerational bonds are also dependent on the degree of disruptions in the families' lives. Life cycle changes due to separation, divorce, and remarriage have differing impacts on the preservation of the grandparent-grandchild relationship. For example, grandchildren often become estranged from the parents (grandparents) of the noncustodial parent. For these grandparents, who had an established relationship with the child before the divorce, the loss can be profound. Often, the only recourse for noncustodial grandparents is to pursue legal measures to ensure a continued relationship with their grandchildren, and even this is not always successful. It is important to note, however, that divorce also may result in more reliance on custodial grandparents for support, and subsequently closer ties develop between that grandparent and the child.

Other predictors of the relational dyad include factors such as frequency of contact, gender of grandparent, kinship position, and age of the grandparent. The amount of time spent together also contributes to the child's experience of having a close relationship with the grandparent because grandchildren who live closer tend to have more contact. Grandchildren report more contact with their grandmothers relative to their grandfathers. Consequently, they also report feeling closer to their grandmothers than their grandfathers. Because the grandmother often is younger and lives longer than the grandfather, this contributes to the greater closeness with the grandmother. Contact alone, however, is an inadequate determinant of closeness in grandparenting relationships. For instance, when given a choice, grandchildren tend to select their maternal grandparents as the preferred one regardless of geographic proximity. However, when only one grandparent is alive the maternal–paternal divide (i.e., kinship position) loses its significance. The living grandparent is reported as the one with the closest relationship by default. A lack of closeness between grandparent and grandchild is also reported among grandchildren whose grandparents are older and have health problems relative to grandchildren with younger and healthier grandparents.

Moreover, as grandparents become more socially removed from the grandchild's world, relationships become increasingly remote. This particular dynamic is prominent among immigrant families in which there is a gap in the social values between acculturated grandchildren and their grandparents. For example, embracing mainstream values and language can create a cultural divide within the Latin American family. Grandchildren who speak Spanish are closer to their grandparents and are more likely to live with them, whereas grandchildren who speak only English are more likely to move away in an effort to establish an independent identity.

Grandparents stand to benefit from a close relationship with their grandchildren. When the relationship is close, grandparents experience a greater sense of well-being and improved morale. Some grandparents even admit to having a preferred or favored grandchild. The close grandparent-grandchild relationship helps to mitigate feelings of helplessness that can accompany the attainment of senior status, thus enhancing mental health. When the intergenerational significance of the grandparent's contribution is considered, the instrumental as well as expressive support to the family is inescapable. Grandparent relationships serve as a reliever of stress, provide needed caregiving assistance, and aid in the child's ego development. Grandparents also offer children a sense of security and a vision for the future.

If deprived of a close grandparent relationship, an individual stands to lose additional nurturing, emotional security, and a cultural and historical sense of self. For example, grandparents participate in feeding, caretaking, and mentoring their grandchildren. For grandchildren, the significance of the relationship also extends into their adulthood. Adult grandchildren continue to value their contacts with their grandparents and are influenced by their presence. Usually, adult grandchildren assume responsibility for maintaining their relationship with their grandparents, but for most, the frequency of their contact is reduced. Nonetheless, grandparents strongly influence their adult grandchildren's ideology by creating realistic examples of older people.

DEVELOPMENTAL PERSPECTIVE ON GRANDPARENTS

Stages in an individual's adult life can be grouped into periods of time spent in courtship, marriage (with or without children), family life (with children at home), empty nest, grandparenthood, and beyond. Some rewards of aging include retirement, an absence from active parenting once children have grown, enjoyment of leisure time, availability to pursue traveling opportunities, and the pursuit of abandoned personal goals during child rearing. In addition to these, the customary grandparent role usually provides much joy and gratification, and makes this an eagerly anticipated stage in the development of the individual.

Grandparenting traditionally has been identified as occurring along the developmental trajectory from middle to late adulthood. A hallmark of middle adulthood is for the individual to develop a genuine concern for the welfare of future generations and to contribute significantly to the world of family and work. Developmental theorists such as Erikson have identified the key developmental task central to this stage as the resolution of conflict between generativity and self-absorption. The essence of successful grandparenthood is embodied in self-choices promoting generativity. Grandparents' caring behavior toward their grandchildren can be interpreted as supporting the continuity of their lineage. This support manifests itself in the form of child care, financial assistance, and the support of the leisure activities of their grandchildren. We often underestimate the extent to which grandparents contribute to the development of their grandchildren indirectly through their emotional, physical, and financial support of their children (the grandchild's parents). Thus, support from grandparents can be seen as contributing both directly and indirectly to the survival of the grandchild, which undoubtedly contributes to the survival of the grandparent's line of descent.

Grandparenting offers a natural outlet for attainment of one's middle adulthood developmental milestones. For example, two of Havighurst's seven major developmental tasks (helping teenage children to become responsible adults and having a social civic responsibility) can be attained through having a close relationship with your grandchild. Through the relationship with a grandchild, grandparents can provide guidance and instruction to their younger family members while contributing to the development of society's next generation.

INTERSECTION OF THE GRANDPARENTING ROLE AND SOCIETAL CHANGES

The reality of societal changes has had an impact on the role of grandparents. Contemporary grandparents are working later in life. Even after retirement, today's grandparents are more likely to pursue a lifestyle that precludes the assumption of child care duties. Grandparents are also less likely to live close to their children, which affects the role of the grandparents in the grandchild's life as well as the kind of assistance offered. Baby boomers who are becoming grandparents and retiring expect to have a higher standard of living than the economy is able to support. Consequently, more of their resources may be directed toward maintaining an expected standard of living, and therefore fewer resources will be available for their grandchildren. In addition, longevity has been extended for older adults. The possible subsequent economic requirement for long-term medical care can tap resources grandparents might otherwise have used to support their younger family members. Another consideration is that newly developed technological entertainment in the form of the Internet, video games, and television all capture the attention and time of youngsters. Grandparents are often challenged to compete with these diverse technological attractions for their grandchildren's attention. Grandchildren as young toddlers are computer active. As a result, grandparents have been encouraged to learn to surf the Internet and play video games so they can engage with their grandchildren. Grandparents have learned to use e-mail as a tool to improve contact and communication with their grandchildren. In general, a mutual lack of appreciation for the different things that the grandchild and the grandparent consider to be important could result in distancing the child from the grandparent. The grandchild might experience the grandparent as nonsympathetic to the child's perspective and also might not be responsive to the grandparent's concerns.

SURROGATE PARENTING BY GRANDPARENTS

Grandparent status was traditionally thought of as a much awaited privilege that generally occurred later in life. Today, the grandparent status is no longer relegated to late life but may occur more frequently at earlier times in one's life cycle. In addition, the

grandparental role may merge with the parental role owing to a set of unfortunate circumstances. Grandparents attain surrogate parental status for a variety of reasons that might include parental death, drug use, AIDS-related illness, incarceration, or the termination of parental rights (often resulting from neglect and abuse). Unlike grandparents who develop traditional relationships with their grandchildren, grandparents who act as surrogate parents have the added responsibilities that accompany the parental role.

Grandparent caregivers not only attend to the child's daily care, they are also responsible for the intellectual and emotional development of their grandchildren. Often, the child's needs require grandparents to accompany him or her to weekly appointments with medical, mental health, and school professionals. In other words, attending to the child's well-being is an active, rather than a passive, endeavor for these grandparents. Intergenerational differences may make it difficult for grandparents to negotiate issues pertaining to the child's development, including academic life and peer interactions. For grandparent caregivers, a traditional perspective of grandparenting is simply unattainable because the circumstances resulting in caregiving dictate otherwise. Moreover, these caregiving situations tend to be a long-term commitment, at times requiring as long as 5 years.

The number of grandparents who are currently providing primary care for their grandchildren is on the rise. During the past three decades, the number of grandchildren being raised by their grandparents has increased by more than 1 million, from 2.2 million (1970) to 3.9 million (1997). More recent census reports estimate the number of households with coresident grandparents and children younger than 18 is 5.8 million (2000). About 2.4 million of these households constitute grandparents serving as the primary caregiver for their grandchildren. Most of these grandparent caregivers were younger than 60 years old.

Although there are a significant number of white (non-Hispanic) grandparents raising their grandchildren as surrogate parents, African American and Latino grandparents are disproportionately represented in this group relative to their white counterparts. Although population estimates suggest only 3.6% of individuals age 30 and older coreside with their grandparents, the rates of minority coresident grandparents differ substantiality, relative to their white counterparts. Compared with 2% of the white population, higher numbers of coresident grandparents were found among Asian Americans (6%), Native American and Alaskan Natives (8%), African Americans (8%), Latinos (8%), and Pacific Islanders (10%). Of these coresident grandparents, 35%, 52%, and 56% of Latinos, African Americans, and Alaskan Natives, respectively, were primary caregivers for their grandchildren. Only about 20% of Asian American grandparents were primary caregivers.

For many grandparents, the short-term shock of their unexpected propulsion into the primary caregiving role is less traumatic than their assumption of parental responsibilities for their grandchildren and its long-term impact on their own development. Researchers on family issues characterize the grandparent-grandchild relationship of grandparents who are primary caregivers as significantly different from traditional grandparent-grandchild relationships. They found that parenting responsibilities adversely affect such more typical grandparental developmental milestones as retirement, as well as their social functioning (which include social interactions and leisure activities). Grandparent caregiver studies have found that parenting has a primarily negative and inhibitory effect on grandparents' lifestyle and on their relationships with friends, family, and spouses.

During the past decade, researchers have steadily increased the amount of available information on grandparent caregiving. The grandparent caregiver role is complex, and researchers have evidenced both costs and benefits associated with this type of grandparenting. In many ways, the relationship is thought to be deleterious to grandparent's well-being. Among African American grandparents, stresses from caregiving result in heightened physical ailments, alcoholism, smoking, depression, and anxiety. Latino grandparent caregivers are also predisposed to experience depressive symptomatology. Custodial grandparents also experience predominant feelings of guilt, self-blame, obligation, and a sense of betrayal. Generally, grandparent caregivers' mental and physical health is poorer relative to their noncaregiver counterparts. Specific areas of stress for grandparent caregivers include social isolation; difficulties negotiating the legal, financial, and educational systems; family conflicts; and limited resources.

Health risks for grandparent caregivers are notable and marked by poor health care behaviors. Grandparents are likely to suffer from hypertension, insomnia, and alcohol and cigarette consumption. Moreover, grandparents who care for their grandchildren as well as their elderly parents were particularly

vulnerable to the negative physical and emotional effects of stress. However, the stress of parenting can be mediated by informal supports from friends and family members. One must consider that, for previous studies, conclusions drawn may only emphasize the cost or burden associated with the grandparent caregiving experience. Undoubtedly, for the grandparent caregiver, the task of caring for one's grandchild may seem emotionally overwhelming and at times physically daunting. The stresses associated with caregiving tend to exacerbate existing medical conditions and allow grandparents little private time. However, despite these problems associated with caregiving, the parenting experience could prove gratifying and maybe even pleasurable for some grandparents.

Most research has focused primarily on the difficulties of the grandparent caregiver experience, and few have discussed the benefits. As such, it is important to note that some grandparent caregivers report they experience a greater purpose for living. In addition, grandparents report rewards such as a chance to raise a child differently, to nurture family relationships, to continue family histories, and to receive love and companionship from their grandchild.

SUMMARY

Undoubtedly, demographic changes due to extended life span have increased the likelihood of adults spending a large portion of their lives in the grandparenting role. Moreover, increased longevity increases the number of multigenerational family structures. Families diversified by sociocultural influences, including divorce rates, remarriage, and other variations of blended families, have also added to the diversity of the grandparenting experience.

Subsequently, the grandparent role has become more complex, reflecting the changing family structures. Grandparents' roles have evolved from a more traditional one largely void of parental responsibility to roles that vary in increasing degrees of responsibility for their grandchild. Grandparents are often required to expand their role to include providing a financial base for their children in the case of divorce and other financially stressful situations. In other instances, they assume full caregiving responsibilities for their grandchildren. The influences on the relationship are as diverse as the roles grandparents assume. Grandparents' relationships with their grandchildren hinge on a variety of factors, including the strength of family ties, frequency of contact with grandchildren, gender of the grandparent, kinship position (maternal vs. paternal grandparent), the amount of time spent together, and the degree of acculturation of the grandchildren. All of these factors contribute to the experience of closeness between the grandparent and the grandchild.

Grandparents stand to benefit from relationships with their grandchild by experiencing a greater sense of well-being and morale. In addition to instrumental supports acquired during the child's early life, grandchildren gain a sense of self and security from their relationship with their grandparents, which extend into their adulthood. Regardless of the dimension, role, or style of grandparenting, the definition of grandparenthood is embodied in the self-choices grandparents make promoting generativity.

—George Stricker, Francine Conway, and Samuel C. Jones

See also Intergenerational Relationships

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GRAY PANTHERS

The Gray Panthers is a national organization founded in 1970 by social activist and educator Maggie

Kuhn in response to insidious ageism within American culture. Ageism is the negative stereotyping, stigmatization, and segregation of people based on age. Through the national organization and coordination of local networks, the Gray Panthers functions as an intergenerational advocacy group dedicated to facilitating social change by combating inequities in a broad range of issue areas, including affordable and adequate housing, health care, work and retirement, nursing home abuse, and many others. The Gray Panthers seeks to unite younger and older people alike in grassroots change through social activism. The organization is known for its use of a variety of techniques to facilitate social change, for example, petition drives, demonstrations, letter writing and telephone campaigns, and large-scale educational programs.

The year was 1970, and Maggie Kuhn was involuntarily retired from her job. She wasn't ready to be put out to pasture, and neither were five friends who were experiencing the same involuntary retirement. Thus began a movement by a woman, her friends, and the addition of college students who were, at the time, opposed to the Vietnam War. This network of friends gathered under the early name Consultation of Older and Younger Adults for Social Change. Shortly thereafter, this new, highly action-oriented group was nicknamed the Gray Panthers, a name that has remained associated with a mission to lead advocacy and activism for social equity and justice on issues affecting older adults.

Combating the effects of ageism has always been at the heart of Gray Panther activities. *Ageism,* a term first coined by Robert N. Butler in 1968, was originally defined as the systematic stereotyping of and discrimination toward older people as individuals and a population group. Ageism reflects extremely negative images of older people and subsequently manifests in the treatment of older people in inappropriate, unfair, and undignified ways. The Gray Panthers actively adopted a visionary counter position to ageism, actively advancing positive images of older people as well as social systems and institutions that were proactively responsive to their needs rather than based on a disease, disablement, disempowerment orientation. For example, in 1973 and 1974, the Gray Panthers New York City Network organized two events that were intended to call into question ageist medical treatment. These events were alternatives to the American Medical Association (AMA) conference and focused attention on health care as a human right. In another bold move, the Gray Panthers in 1974 staged guerrilla theater outside the site of the 123rd AMA annual meeting. Health care inequities, lack of adequate housing, the need for long-term care, mandatory retirement, and the impact of demeaning stereotypes in the media were just some of the "causes" that the Gray Panthers actively sought to ameliorate throughout the latter half of the 20th century.

Maggie Kuhn died on April 22, 1995, at nearly 90 years of age and just following the 25th anniversary celebration of the Gray Panthers. Her leadership was central to the inspiration and determination of all who were involved with the Gray Panthers. Following her death, the national organization struggled and then moved forward under the leadership of a dedicated board of directors and its chairperson. A 5-year strategic plan was prepared, and, in 1997, the Gray Panthers held their first national convention since Maggie's death.

Since the 1990s, the Gray Panthers has continued to launch activist efforts targeting universal health care, Medicare, education, economic justice, family security and community safety, job and worker rights, social security, and other national issues that affect the basic ethical and human rights of older people.

—Barbara A. Hawkins

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GROSS MOTOR DEVELOPMENT

Gross motor skills have traditionally referred to motor activities that move the body through the environment or use the large muscles of the torso, arms, and legs to transport or displace an object in some

way. By contrast, fine motor skills have typically been described as involving the arms, hands, and fingers in acts of manipulation. For example, psychometric assessments of gross motor skills include balance, crawling, walking, running, jumping, climbing, and hopping, but may also include throwing or other ball-handling or hitting activities. However, this distinction has more recently been recast with respect to the underlying dynamics of the behavior and the ecological fit between dynamics and the information available to the actor.

A dynamical systems perspective on motor development provides a set of fundamental principles for characterizing gross and fine motor skills in terms of action systems. These are very general functional classes of behavior that have evolved in response to particular environmental pressures. The focus here is on three action systems: basic orienting (maintaining a functional orientation to gravity and to the surfaces and media of the environment), locomoting (moving from place to place by using disequilibrium to initiate motion), and performatory acts that displace objects by producing large forces or contain objects that approach the body with large forces. The development of these three action systems throughout the life span is proposed as the underlying basis for the observation of age-related improvements in the traditional gross motor skills of balance, locomotion, and physically displacing objects. Exceptionally skilled performance by adults during performatory acts, such as juggling, reveals clues about the fundamental principles of coordination. Moreover, the problems of balance experienced by aging adults illustrate the relation between basic orienting and other skills, especially locomoting.

BASIC ORIENTING

All of the action systems consist of several functionally specific components of orienting: obtaining a relatively persistent orientation to the environment, supporting the body's weight, balancing forces acting on the body and limbs, and keeping the perceptual systems attuned to available information. These components of orienting are clearly at play in the development of sitting and standing during the first year, skills that require control of destabilizing forces acting on the body. There are two notable trends in the development of sitting and standing. First, achievement of postural stability makes it possible to anticipate and counteract muscular forces. During sitting, for example, coordinated activation of the extensors and flexors of the trunk and hips allows the infant to control upper body sway. With improved trunk balance, there is a narrowing of the base of support as the legs are brought together and extended at the knees. Similarly, during standing, infants learn to control rotations about the ankles by applying torques (rotational forces) at the joint. Second, the achievement of postural control opens up new possibilities for perceptually exploring the body's capabilities, such as manipulating objects with hands freed from the task of support.

LOCOMOTION

The locomotor action system builds on this foundation of basic orienting: between 15 and 18 months, standing infants allow the body to sway forward in order to initiate walking. Force plate measurements demonstrate that once infant walkers reach a steady-state velocity, their step-cycle organization is virtually identical to that of mature walkers. The step cycle consists of four phases. Swing phase (toe-off to heel-strike) is divided into F(lexion) and E(xtension) phases. The F begins at toe-off and ends as knee extension begins during swing. The E1 phase begins at knee extension and ends at heel-strike. The stance phase (from heel-strike to toe-off) consists of E2 and E3 phases. The postural instability that promotes a transition from stance to walking is also apparent in the developmental transitions in coordination of gait. Detailed longitudinal kinematic analyses indicate that for newly walking infants, intralimb coordination of shank and thigh motion is unstable, but attracted to a consistent phase angle. By 18 months, a reciprocal arm swing and heel-strike are present. Mature gait, as assessed by single-limb stance duration, step length, ratio of pelvic to step width, and progression velocity is well established by age 3. Walking velocity and stride length increase throughout childhood, and stride width is becoming narrower.

When the step cycle is placed in the context of its ground support, it becomes apparent that the muscles do not supply all of the forces used for locomoting. When a pulling or pushing force stretches a material (such as biological tissue), the energy stored in the material will provide potential energy for an elastic force that tends to return the material to its original state. Infants younger than 1 year of age will learn to harness the elastic forces stored in a spring as they bounce vertically. Walking proficiency improves in

toddlers as step frequency and length, head and trunk stability, amplitude of hip flexion, and coordination of lower limb movements reflect a dynamic integration of postural equilibrium and forward propulsion. During running, both gravitational potential energy and forward kinetic energy reach a minimum in the support phase, and both go through a maximum as the body takes off and flies through the air. Once toddlers begin to run, they may begin to harness the elastic potential energy at particular moments in the step cycle.

Developmental levels of hopping and jumping illustrate how further improvement in the child's ability to harness properties of the body and its relation to gravity enable them to safely use greater forces to propel the body away from support surfaces. During hopping, each of the four limbs, which characteristically behave like harmonic oscillatory systems, appears to become mutually entrained so that they act as a single "spring." Developmental changes are attributed to changes in the dynamics of the system. For example, in developmental level 2, called *fall and catch,* forward lean allows the body to fall forward of the support foot, the swing leg is inactive, and balance is recovered in the landing. Here, the force of landing on the support foot is quite high. In level 3, called *projected takeoff*, the swing leg pumps up and down to assist in takeoff. The basis for the developmental transition is a change in a dynamical parameter of the body, namely, stiffness. Rather than continuing a jarring, potentially injurious manner of hopping, the body reorganizes its movement, lowering the stiffness setting in the landing leg (perhaps through central regulation of the stretch reflex).

Jumping is another means of using the considerable force production of the body to escape the pull of gravity. It is used throughout the life span for projecting the body into the air in a way that achieves a wide range of skilled performance, including dance and athletics. Descriptively, jumping develops by increasingly taking advantage of the propulsive power of the shoulders and arms. The youngest children use no arm action, and leg action is usually a one-foot takeoff. Next, there is some shoulder flexion, but the arms remain immobile. Finally, children use shoulder flexion at the time of takeoff to achieve a complete and efficient arm action. Interestingly, even though position and magnitude measurements of the lower extremities change between the ages of 3 and 9 years, delay in peak extension velocity for hip, knee, and ankle remains highly consistent. This suggests that the support aspect of the jump that maintains orientation to the ground remains stable and that developing the capacity for propulsion of the body into the air is a process of introducing disequilibrium against a background of postural stability.

ACTIONS ON OBJECTS

The performatory act of propelling an object by means of perceptually guided release or brief contact with parts of the body (e.g., throwing, hitting, or kicking a ball) requires postural support on the ground that can withstand changing disequilibrating forces. Children may first begin to push a ball from a seated position, but once they have gained standing stability during the toddler period, rudimentary throwing patterns appear. The developmental pattern is one in which there is a rapid transfer of support in muscle groups so that a flowing sequence of muscular action produces propulsive force at a single point of contact with the ball. Throughout childhood and into adulthood, throwing velocity and accuracy increases, and individual differences in skill become apparent in games involving throwing, hitting, or kicking a ball. Early skilled performance in using the two hands, as in clapping, and expertise in coordinative skills, such as juggling, may have an underlying basis in the ability to detect regions of stability in dynamics and to time actions of upper body so that they are only intermittently stable. Coordination on the "edge" of stability in the phase relation of both hands introduces a degree of flexibility to adapt to the even tiny fluctuations inevitable in each catch and throw.

The dynamics of movement relative to balance and postural support is also the basis for age-related declines in walking performance by older adults. Beyond about age 60, walking velocity decreases, there is less vertical excursion of the center of gravity, and disturbed coordination exists between upper and lower extremities. During the seventh and eight decades, there is often a further loss of the normal arm–leg synergy, an overproduction of "unwanted" movements, and diminished flexion in the swing phase. At the approach of the century mark, there may be rapid disintegration of the gait pattern, arrhythmia in step rate, and absence of any arm swing movement. The similarities between motor patterns in early childhood and senescence, respectively, suggest that both periods in development experience instability in postural equilibrium. In the former case, such disequilibrium comes to be used in the

service of development of new motor skills. It remains to be determined whether advances in 21st century technology will assist older adults in preventing such disequilibria from becoming incapacitating.

—Eugene C. Goldfield

See also Fine Motor Control

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H

Humor

Humor is the great thing, the saving thing. The minute it crops up, all our irritations and resentments slip away and a sunny spirit takes their place.

—Mark Twain

HABITUATION

Any unconditioned response that is elicited in response to an unconditioned stimulus will show habituation if the stimulus is repeated. That is, measures of the response will show orderly decreases in magnitude as the stimulus is repeatedly applied. Habituation can be seen in the withdrawal responses of protozoa to tactile stimulation, in the freezing-defensive responses of rodents to auditory stimuli, and in the orienting responses of human infants to complex auditory and visual stimuli; it is one of the most fundamental properties of behavior. More simply put, habituation is a process in which a stimulus loses novelty and in which decreases in responsiveness to the stimulus are seen when the stimulus is presented repeatedly or for an extended time period. An organism ceases to engage in attending or otherwise responding to the stimulus; the stimulus comes to be ignored.

One of the most apparent trends in recent psychology has been the attempt to redefine basic behavioral processes in terms of more complex cognitive processes; as a result, habituation used to be considered *nonassociative learning* because only one stimulus was involved but has been termed *implicit learning* by some writers, implying that "implicit memory" may be involved.

WHAT ARE SOME OF THE PROPERTIES OF HABITUATION?

The formal study of habituation goes back nearly a century, being described by writers in the early 20th century and with the basic properties being outlined in the 1930s and again in the 1960s and 1970s. Some nine basic features of habituation were formally outlined and have come to serve as a formal definition of habituation:

1. If a specific stimulus elicits a response, repeated presentations of that stimulus result in decreased response or habituation; the decrease is typically an orderly function of the number of stimulus presentations.
2. If the stimulus is subsequently withheld, the response showing habituation will tend to return or recover with the passage of time, termed *spontaneous recovery*.
3. If the habituation experience and subsequent opportunity for recovery are repeated in a series, then habituation will progress more rapidly.

4. With all other variables held constant, the higher the frequency of stimulation, the more rapid and pronounced is habituation.
5. With weaker stimulation, habituation will progress more rapidly and be more pronounced.
6. The effects of habituation training may progress below baseline measures of the response.
7. If habituation occurs to a specific stimulus, then habituation to similar stimuli through stimulus generalization also occurs.
8. Presentation of an irrelevant stimulus will result in the recovery of the habituated response, termed *dishabituation*.
9. With repeated presentation of the dishabituating stimulus of number 8, the degree of resultant dishabituation is decreased or shows habituation itself.

A modified list of defining features has also been put forth, with the following additional defining characteristics:

1. The process of habituation will be disrupted by any unpredictable changes in the eliciting stimulus.
2. Habituation will occur more slowly to stimuli that are presented in a varying manner relative to stimuli presented in a constant, unchanging manner.
3. Spontaneous recovery may occur faster after more rapid rates of stimulus presentation relative to slower rates of stimulus presentation.
4. Spontaneous recovery may be incomplete recovery in that some habituation will persist over a long time period.
5. Habituation will be observed for most if not all animal species; habituation occurs in response to most stimuli, including events without ingestive consequences such as lights and noises. The rate at which habituation will be observed will differ as a function of the species, the stimuli employed, the responses being measured, and the individual subject.

As defining features, any behavioral stimulus-response contingency is said to display habituation if the response decrement shows these properties.

HOW IS HABITUATION STUDIED IN INFANTS?

In general, studies of human infant habituation employ variations of some basic themes. In measuring the rate of a reflex such as the sucking reflex, researchers measure the initial baseline rate of sucking to a pacifier equipped with transducers to measure muscle contractions applied to it. Then an auditory stimulus is presented, such as a human voice uttering a speech phoneme such as "ba." In response to a novel stimulus such as this, the rate of sucking will predictably increase but come to decline to baseline levels as "ba" is repeatedly presented, showing habituation. If the phoneme "pa" were to then be presented, the rate of sucking would again increase, demonstrating that the infant can discriminate between these two stimuli.

To measure more complex responses, slightly different procedures are used. When an intense or novel stimulus is presented, an orienting response is elicited, and an infant (or any person) turns to look and fix the gaze at the source of a visual stimulus or turns the head toward the source of an auditory stimulus, as well as shows changes in heart rate, electroencephalogram (EEG) patterns, and other autonomic responses. Initially, infants show this orienting (or orientation) response to a stimulus, but after repeated trials of stimulus presentations, infants no longer respond to the stimulus, showing habituation of the orienting response. Researchers in human development have used measures of the orienting response as assessment tools of complex human development, described in the next section.

ROLE OF HABITUATION IN HUMAN DEVELOPMENT AND LEARNING

Habituation procedures have increasingly been employed to assess the covert-behavioral abilities of preverbal infants to study the development of perception, remembering, and what is termed *information processing* as part of basic developmental research. In addition, the performance of infants on habituation tasks has been shown to be a reliable and independent predictor of long-term development. Indexes of the speed or efficiency with which infants show habituation have been shown to predict outcomes in behaviors such as language acquisition as well as more general behavioral outcomes such as verbal and nonverbal intelligence. Infants who show difficulty during habituation or habituate at slower than normal rates have been found to be at increased risk for a range of significant developmental delays. Populations of infants with Down syndrome, teratogen-exposed infants, malnourished infants, and premature infants have been studied.

Some researchers have found that at an age of 16 months, high-risk infants show rates of habituation comparable to newborn infants. Full-term infants have been shown to have more favorable measures of habituation indices than did preterm infants (birth weight < 1,750 grams) at 5, 7, and 12 months. Despite its widespread use, some writers have argued that the precise psychometric parameters of habituation need to be established before any definitive and significant dialogue on the predictive value of habituation can be conducted. Some such studies have also been criticized for using highly artificial events as stimuli, such as an artificial voice box, instead of a stimulus with higher ecological validity, such as recordings of actual human utterances as auditory stimuli.

Despite cross-study comparisons being obfuscated by procedural differences as well as in the response being measured, and despite that normally developing infants show a range of individual variations in habituation, acceptable measures of test-retest reliability have been obtained for some measures of habituation. Unfortunately, few such data exist for populations of high-risk infants, among whom the pertinent data would be of greater interest.

WHY AND HOW DOES HABITUATION OCCUR?

The observation that habituation is so catholic points to an obvious and basic adaptive significance. Constantly responding to meaningless stimuli would be taxing and wasteful to any organism; learning to not respond to biologically irrelevant events while still responding to events that are biologically significant has clear survival value.

For some stimulus-response contingencies that show habituation, the physiological mechanisms have been identified, and although habituation has 9 (or 14) defining features, only one established physiological process has been elucidated. In studies of simple reflexes of invertebrates, such as a defensive-withdrawal reflex to tactile stimulation, the organism ceases to respond as the repeated stimulation causes a sensory neuron receptor to no longer release the necessary neurotransmitter to an effector motor neuron for the response to occur. The sensory neuron will continue to release its neurotransmitter in response to a different stimulus, and the reflex will still occur to a different stimulus but not to the stimulus to which habituation has occurred. That is, the observed change in responsiveness will be stimulus specific but show stimulus generalization to physically similar stimuli.

In terms of identifying the biological bases of habituation in vertebrates, less progress has been made, but research so far points to similar neural events taking place in distinct lower brain areas depending on the sensory modality of the stimulus and the nature of the response undergoing habituation. Little if any research has been conducted into the biological basis of habituation in humans, but the infrahuman models of habituation are considered more or less applicable.

SUMMARY

Habituation is a ubiquitous behavioral phenomenon, seen with virtually every response of a wide range of organisms to repeated stimulation, and because it is so universal, it has been argued as having adaptive value. Whether it merely reflects basic behavioral processes such as learning or more complex actions such as attention or memory is debated. Researchers in human development have studied habituation both for purposes of basic research and as a possible diagnostic mechanism to map and possibly predict developmental delays and disorders. Habituation will continue to be the subject of human development research for many years to come.

—Brady J. Phelps

See also Learning

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HALL, G. STANLEY (1844–1924)

Granville Stanley Hall is commonly known as the father of American developmental psychology, and his contributions in the developmental field and in psychology in general are numerous and invaluable. Born in Ashfield, Massachusetts, Hall grew up on a farm and was initially intending to become a minister. He graduated from Williams College and studied theology at the Union Theological Seminary. Religion, morale, and Jesus later became topics of his books. Hall studied under William James at Harvard, and in 1878 was the first person who ever obtained a PhD in psychology in the United States. After finishing his PhD at the age of 34, Hall followed his dream to go to Germany and study psychology with Wilhelm Wundt in Leipzig (1878–1880). Coming back to the United States, Hall was a lecturer at Harvard and later accepted a position at Johns Hopkins University in 1882, as lecturer and later professor of psychology and pedagogy. Hall followed Wundt's methodology and opened a psychological laboratory at Johns Hopkins University. Advancing the scientific study of psychological phenomena, Hall adopted the experimental method in his laboratory using surveys, controlled observation of children and their families, and fostering the development and application of scientific tests. When Clark University in Worcester, Massachusetts, opened in 1889, Hall transferred to Clark and became its first president. In 1909, Hall organized a conference that was attended by Sigmund Freud and Carl Jung. Hall devoted his life's work to understanding the process of development and stayed at Clark University until his death in 1924.

It's no exaggeration to state that Hall is the father of American developmental psychology. Particularly, Hall focused on the study of children, development, and education in his pioneering studies "Adolescence" (1904) and "Educational Problems" (1911). He also founded the Child Study Association of America in 1888. Some people see Hall not only as the founder of American developmental psychology but also as the father of scientific American psychology. Impressively, by 1898, Hall had supervised 30 of 54 U.S. PhDs in psychology. He mentored graduate students and founded the first psychological journal in the United States, the *American Journal of Psychology* in 1887. As his passion was great and his vision steadfast, he had also started other journals, such as the *Journal of Genetic Psychology* in 1891, the *Journal of Religious Psychology* in 1904, and the *Journal of Applied Psychology* in 1915. A lifetime achievement in and of itself, Hall was instrumental in forming the American Psychological Association. He became the organization's first president in 1892 and was re-elected shortly before his death in 1924.

Hall's (1904) research interests focused on education, child development, and evolutionary theory, topics that are still relevant and at the heart of development to this day. His theory was influenced by Darwin's evolutionary theory and is based on the assumption that ontogeny recapitulates phylogeny. He viewed human development as a recapitulation of the biological and cultural history of humankind. According to Hall, the child repeats cultural evolution in his or her play. Hall developed a stage model of development and argued

that before the age of 8, a child ought to be free in expressing his or her spirits, and only after the age of 8 should formal learning occur. He had also proposed that it is later in adolescence that the child becomes ready to deal with moral issues and service for others. According to Hall, the curriculum should follow the needs and interests of children in their specific stages. Besides his main interests in development and education, Hall had other interests and efforts in gender differences, racial issues, emotions, hypnosis, basic psychological processes, and social and industrial psychology, to name a few. He has left his indelible mark in the fields of psychology and developmental psychology, and people during his lifetime and still today are impressed, indebted, and grateful to him.

—Ma Teresa Tuason and C. Dominik Güss

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HARLOW, HARRY (1905–1981)

Harry Israel was born in Fairfield, a small rural town in Iowa. He was the third of four boys and grew up in a family that placed a premium on the value of education. Upon completion of his bachelor and doctoral degrees at Stanford University, his advisor convinced Harry to change his surname from Israel to Harlow owing to concern over possible discrimination because of his name. In 1930, Harlow began work as a comparative psychologist at the University of Wisconsin in Madison and remained there for his entire career. Among numerous honors, Harlow was a member of the National Academy of Sciences, was elected president of the American Psychological Association, and received the National Medal of Science from President Lyndon B. Johnson in 1967.

Although Harlow studied complex information processing and curiosity in nonhuman primates, it is his work on nonhuman primate affectional systems that has had the most lasting impact. He was one of the first researchers to study love scientifically, but this was not the intent of his original work. In nonrelated work, Harlow separated infant rhesus monkeys to decrease the spread of disease, especially tuberculosis, in the animal colonies with which he was working. After observing the infants' unusual social behaviors that ensued following the separations, Harlow serendipitously began his exploration of affection.

Infant rhesus monkeys, when separated from their mothers, exhibit behaviors including withdrawal and emotional discomfort as well as atypical social and sexual behaviors. Curiously, however, these monkeys seemed to become attached to cloth items in their cage. *Contact comfort* was a phrase first coined by Harlow to describe the fact that the infants clung to cloth surrogate mothers placed in their cage, particularly during times of distress, rather than to nourishing surrogates. The results of Harlow's studies supported the work of ethological attachment theorists such as John Bowlby who held that attachment relationships are primary, not secondary, to the food that nonhuman primates' mothers provide to their young, as psychoanalytics and behaviorists once believed.

Harlow's ingenious work with infants and surrogate mothers had widespread impact, influencing attachment theorists and psychiatric treatments as well as the general scientific perception of affection. His own work and the research of his students have had a lasting impact on the field of psychology.

—Alyssa Kerestes and Matthew J. Hertenstein

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HATE CRIMES

Crimes against people and property can be motivated by many different things, including greed, anger, and a desire for revenge. The subset of crimes known as hate crimes are those unlawful acts that are motivated by prejudice against a group that the victim is believed to belong to or identify with. U.S. law classifies crimes based on bias against a victim's perceived race, religion, sexual orientation, disability, and ethnicity or national origin as *hate crimes*. Some states have also added gender to the groups that can be classified as victims of hate crimes.

Victims of hate crimes are not limited to individuals. Businesses, institutions (such as a church or a mosque), communities, or even society as a whole can be a victim of a hate crime. Likewise, there is a range of offenses that are perpetrated against hate crime victims. Crimes against persons include intimidation, aggravated assault, rape, and murder. Crimes against property include vandalism, arson, theft, and robbery. Although offensive to many, certain types of hate-based behaviors are protected by U.S. law. Actions such as the creation of hate literature or the public expression of hateful speech are allowed until they cross over into making direct threats against identifiable people, organizations, or institutions.

PREVALENCE RATES

Since 1991, incidences of hate crimes in the United States have been compiled on a yearly basis by the Federal Bureau of Investigation (FBI). For the year of 2002, law enforcement agencies recorded 7,462 hate crime incidents. Racial bias was the motivator for most of these offenses. Table 1 provides a breakdown of the type of bias for all reported incidents.

Hate crime offenses are more than twice as likely to be crimes against persons as crimes against property. Table 2 provides a breakdown of the type of offense for all reported hate crimes in 2002.

Many experts agree that these figures underestimate the actual number of bias-motivated crimes. The FBI relies on reports from local law enforcement to compile the national hate crime statistics. Inconsistencies in reporting or nonparticipation may artificially decrease the totals. By their very nature, hate crimes are designed to intimidate and may keep the victim from reporting the attack to authorities. There is evidence that victims of nonbias crimes are twice as likely as victims of hate crimes to report their victimization.

Table 1 Types of Bias for Reported Hate Crimes

Type of Bias	*No. of Incidents*	*Percentage*
Race	3,642	48.8
Religion	1,426	19.1
Sexual orientation	1,244	16.7
Ethnicity/national origin	1,102	14.8
Disability	45	0.6
Multiple biases	3	<0.1

PERPETRATORS

It is a common perception that perpetrators of hate crimes are members of organized hate groups such as the Ku Klux Klan. In reality, only about 5% of known offenders are members of such groups. Most attackers are otherwise law-abiding citizens.

The most vicious hate crimes do tend to be committed by people with a history of antisocial behavior and ties to organized hate groups. For these individuals, prejudice and hate are the major focus of their lives, and they are actively involved in recruiting and indoctrinating new members. Although this group represents a small minority of actual perpetrators, organized hate groups facilitate wider disturbance by providing information and encouragement to anyone who wants it.

Most perpetrators are so-called dabblers, for whom hateful behavior is a part-time affair. These people do hold prejudiced beliefs that they express through behavior but typically keep these hidden in areas of their lives. For example, at work, they may keep their beliefs to themselves but on the weekends get together with like-minded friends to harass people who they perceive as being different.

Young people represent a significant number of hate crime offenders. Of known hate crime perpetrators, 33% are younger than 18, and 29% are between the ages of 18 and 24. The high rate of teenage and young adult participation in these crimes is one reason why most intervention and prevention programs are school based.

Two other groups of people are not active perpetrators of hate crimes but do encourage an atmosphere in which such actions can take place. Although they may

Table 2 Types of Offenses for Reported Hate Crimes, 2002

	*No. of Offenses**	*Percentage*
Crimes Against Persons	**5,960**	
Intimidation	3,105	52.1
Simple assault	1,791	30.1
Aggravated assault	1,035	17.4
Murder and nonnegligent manslaughter	11	0.2
Forcible rape	8	0.1
Other	8	0.1
Crimes Against Property	**2,823**	
Destruction, damage, vandalism	2,347	83.1
Larceny-theft	151	5.3
Burglary	131	4.6
Robbery	131	4.6
Arson	38	1.3
Motor vehicle theft	9	0.3
Other	16	0.6
Crimes Against Society	**49**	

*The number of offenses exceeds the number of reported hate crime incidents because an incident may include more than one offense type.

never act on their beliefs, sympathizers agree with the ideology of perpetrators. Sympathizers typically express their beliefs only at the verbal level, but these acts show support for more serious hate acts. Furthermore, sympathizers are unlikely to cooperate with efforts to stop hate crimes. The second group of people who help facilitate a hate-accepting environment are spectators. These are people who may disagree with prejudiced speech or behavior but are unwilling to stop it. Others may view their silence as approval and so draw encouragement from spectators.

CAUSES

Hate crimes are certainly designed to hurt or intimidate the victim but are also meant to send a message to the victim's community: you are not welcome here. Such crimes share a basis of negative beliefs about groups of people who are perceived to be different in a significant way. But what motivates individuals to act on these prejudices varies. Hate crime perpetrators can generally be divided into four main categories of motivation: ideology, thrill, defense, or peer dynamics.

Ideology

Ideology perpetrators draw strongly on their bigotry for motivation. They have a very rigid view of the world and believe themselves to be maintaining or restoring social order and morals. An ideology offender may believe, for example, that interracial relationships are wrong and threaten the morals of society. By drawing on perceived support in the community, the offender may attack a person who is part of an interracial couple to enforce these beliefs.

Thrill

The main motivations of thrill seekers are to experience excitement and power. These assailants are usually young people, often groups of teenage boys, who crave respect and attention. They themselves are marginalized in some way, be it economic, educational, or social. For thrill seekers, hate crimes bring excitement to otherwise idle time and give them a sense of importance and strength by putting others down.

Defense

Defense-motivated crimes occur when the offender feels threatened by a hated group. For example, an African American family may be targeted after they move into an all-white neighborhood, or a male assailant may attack a gay man because he feared that the man would make sexual advances toward him.

Peer Dynamics

Individuals who are motivated by peer dynamics participate in hate crimes to gain respect from friends. These people are searching for acceptance and engage in hate crime primarily as a means to please others and prove their toughness.

PREVENTION

Hate is learned. Whether through direct teachings of parents or subtle attitudes of society, individuals encounter messages of intolerance from the outside environment. The ideal way of preventing hate crime is to prevent the development of prejudice. A common factor among people who have resisted participation in hate activities, such as individuals who helped Jews escape Nazi Germany, is the existence of a role model who respected diversity.

A secondary solution is to alter those prejudiced beliefs that have already developed. The major way to change misconceptions about others is through purposeful exposure. Whereas simple contact between groups may encourage stereotypes and lead to bias crimes, cooperation between people is related to a decrease in negative attitudes. By working cooperatively with others, individuals gather information that challenges their previous beliefs. They also begin to see similarities between themselves and people they used to see as being very different. After one's attitudes are changed about a specific person, those positive feelings generalize to the group to which that person belongs. U.S. organizations such as Partners Against Hate, the Southern Poverty Law Center, and the Anti-Defamation League have developed numerous educational materials that teach accurate knowledge about different groups and facilitate interaction and understanding between peoples.

Because we have not yet reached the ideal of completely preventing the development of hate, programs that resolve intergroup conflict are needed. The Community Relations Service of the U.S. Department of Justice is an organization that provides information and free mediation services to communities that have experienced a hate incident or conflicts between people based on differences in race, ethnicity, or national origin.

SUMMARY

Hate crimes are based on learned attitudes of prejudice against groups that are perceived to be different. Perpetrators of these crimes are typically otherwise ordinary citizens who use their hate to gain power, thrill, or acceptance. Prevention of hate crimes begins with developing attitudes of tolerance and acceptance instead of prejudice and discrimination.

—Alicia Ito Ford

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HEAD START

Head Start is the oldest, largest, and most widely known early intervention program for young children and families living in poverty. Created in 1965 as an 8-week summer program, it soon grew to a full-year preschool program. Head Start center- and home-based programs reside in all 50 states, the District of Columbia, Puerto Rico, and the U.S. territories, and serve more than 900,000 young children and their families. The principal components of Head Start include health care, education, nutrition, social services, parental involvement, and employment and career development. The primary goal is to foster healthy development (cognitive, social, and emotional) in low-income children.

HISTORY

In 1964, President Lyndon Johnson declared "War on Poverty" in his State of the Union Address and named Sargent Shriver head of the War on Poverty program. Under Shriver's direction, the Office of Economic Opportunity formed a Head Start Planning Committee composed of 13 scientists, including pediatricians, psychiatrists, psychologists, nurses, educators, and social workers. Because of the diverse backgrounds represented on the Planning Committee, the focus of Head Start went beyond education to include other aspects of early childhood development. The Committee proposed seven major goals for the preschool program: (1) improving children's physical health and physical abilities; (2) facilitating the emotional and social development of children by encouraging self-confidence, spontaneity, curiosity, and self-discipline; (3) training children's mental processes and skills with particular attention to conceptual and verbal abilities; (4) establishing patterns and expectations of success that foster confidence for future learning efforts; (5) expanding children's capacity to relate positively to family members and others while also

strengthening the family's ability to relate positively to their children and their children's limitations; (6) developing in children and in families a responsible attitude toward society, and fostering constructive opportunities for society to work together with disadvantaged families in solving their problems; and (7) increasing the sense of dignity and self-worth of children and families. In these ways, Head Start aimed to break the "cycle of poverty" by providing a comprehensive program that targeted the cognitive, emotional, social, health, nutritional, and psychological needs of low-income children.

In 1965, the Office of Economic Opportunity launched Head Start as an 8-week summer program in more than 2,500 communities, serving more than half a million children younger than 7 years of age. Head Start transitioned from a vision to a functioning program in just a few months. A year later, Head Start expanded to a full-year program serving 350,000 children at 10,000 child care centers. In this brief time, more than 30,000 teachers were trained, and Head Start was enthusiastically welcomed by parents, community leaders, and educational and child development specialists across the nation. Described succinctly in this way, the program might sound like a Utopian intervention, which it clearly was not. In many programs, most of the teachers and other employees were parents of Head Start children who were themselves undereducated and underqualified for the program responsibilities that they assumed. There were then, and remain today, many financial, logistical, and technical challenges to the viability of the program, but a start had been made.

Head Start has undergone many changes under the leadership of Dr. Julius B. Richmond, a prominent pediatrician who served as the first director of Head Start, and Dr. Edward F. Zigler, a distinguished academic psychologist from Yale who was appointed as the first director of the Office of Child Development. In 1969, Head Start was transferred from the Office of Economic Opportunity to the Office of Child Development in the U.S. Department of Health, Education, and Welfare (later renamed the Department of Health and Human Services). Amendments to the Economic Opportunity Act of 1969 allowed participation in Head Start to children from more affluent families if they paid for those services, but that system was dismantled after 1 year owing to problems in its implementation. In 1972, another amendment was made to the Economic Opportunity Act calling for expansion of Head Start program opportunities to handicapped children. The legislation mandated that handicapped children constitute at least 10% of the national Head Start enrollment. A year later, program directors created the National Head Start Association to serve as a lobbying agency for Head Start. In 1974, a Congressional Act reallocated Head Start funding priorities to encourage research, demonstration and pilot projects, and ongoing evaluations of Head Start programs.

In 1975, Head Start Program Performance Standards were issued. Recognizing the uneven quality of programs nationwide, Dr. Zigler feared that the benefits of high-quality Head Start programs would be "washed out" by their underperforming counterparts. In the same year, the Child Development Associate program started offering training and credentialing to child care workers, and more than 50,000 Head Start employees have earned their associate's degrees since 1975. In 1994, Congress passed legislation signed by President Clinton that required the Head Start Program Performance Standards to be revised and published in 1996. In 1998, the Head Start Reauthorization Act mandated expansion of Head Start to a full-day, full-year service. To date, Head Start has served more than 22 million children and their families.

Today Head Start is housed in the Administration on Children, Youth and Families at the Department of Health and Human Services. It is locally administered by community-based nonprofit organizations and school systems in all 50 states, the District of Columbia, Puerto Rico, and the U.S. territories. Head Start serves urban and rural children and families from many different ethnic backgrounds. In the year 2003, there were more than 900,000 children enrolled in Head Start, with 19,200 centers in operation, although even today, not all 3-year-olds can be accommodated who wish to enroll. (Four-year-olds are usually given preference for enrollment because 3-year-olds will still have another opportunity when they are a year older.) Of the children served currently by Head Start, 28% are white, 32% are African American, 31% are Latino, and about 9% are Asian/Pacific Islander or Native American. At least 90% of Head Start children must come from families with incomes at or below the federal poverty line, which currently allows about $30,000 of income for a family of four. The primary exception to the poverty rule is that the 10% of children who are handicapped may come from more affluent families. Some Head Start programs have difficulty complying with the 10% guideline because many handicapped

children cannot reliably be identified before 5 years of age, but the program nationally has been successful in identifying and serving preschoolers with special needs, and 12.5% of the national enrollment in 2003 consisted of children with disabilities.

Head Start programs comprise the following main components: health care, education, nutrition, social services, parental involvement, employment, and career development. Health care provides immunizations, medical and dental checkups, eyesight tests, and mental health services. The Head Start founders believed that unhealthy children have difficulty performing in school; therefore, making health care a primary objective should equip children better to handle the later challenges at school. Educational curricula are designed to provide important learning experiences that low-income children might not otherwise receive; such provisions foster intellectual, social, and emotional growth.

Between 1997 and 2000, the Families and Child Experiences Survey (FACES) examined the quality of Head Start classrooms using measures of quality consistent with the Head Start Program Performance Standards. More than 70% of classrooms studied scored in the "good" or "excellent" range, and very few in the "minimal" range. Most Head Start teachers used the Creative Curriculum by Teaching Strategies program or the High/Scope curriculum, but 41% used another curriculum. Most teachers liked their curriculum for a variety of reasons, including that it covered multiple domains, was easy to use and adapt, involved parents, allowed room for teacher creativity, and provided adequate learning materials.

Besides educational resources, Head Start provides or arranges for social services that might be needed, including community outreach, referrals to other agencies, family needs assessments, recruitment and enrollment of children, and emergency assistance and crisis intervention. A critical objective of Head Start is to encourage parent participation, such as assisting teachers and social workers as paraprofessionals, serving on policy councils and committees, and attending classes and workshops on child development. In 2003, 28% of program staff members were parents of current or former Head Start children, and more than 880,000 parents volunteered in their local Head Start programs. These figures underline a common misperception: Head Start is *not* solely a program for children; it is a program for families as well. Through their involvement, it is intended that parents learn from Head Start how to teach, train, and nurture their own children. The last Head Start objective is to foster employment and career development. Most staff members are recruited locally and are offered training and credentialing opportunities, in hopes of improving child care quality and career prospects through the additional training. The FACES study found that nearly 60% of teachers received training in their curriculum from their own programs, 14% received this "technical assistance" from the developers of the curricula, 10% from a Head Start Quality Improvement Center, and the remainder from other sources.

About 1.4 million people volunteer their time to Head Start programs and projects. Volunteers include parents and grandparents of Head Start children, high school and college students, senior citizens, and homemakers. Volunteer opportunities range from being a front desk receptionist, to serving as a classroom aide, to assisting with special events.

PROGRAM EXTENSIONS

Beyond the center-based Head Start program, several program extensions have evolved through the years since its inception. Some prospered and continue to operate, whereas others fell by the wayside, but many of the features of Head Start that have proved to be valuable and effective started out as experimental ventures by teachers, parents, or program directors.

The first offshoot of Head Start, Project Follow Through, was implemented in 1967 by the Department of Education. The purpose of this program was to extend the Head Start vision into elementary schools, thus creating a more gradual transition into public education. Follow Through began as a pilot program in 40 school districts and was expanded to full-scale within 1 year. Unfortunately, the program did not receive the funding necessary to implement the comprehensive Head Start curriculum; thus, no universal model of Follow Through was adopted. The program continued to operate into the 1990s, but only as an experimental program in newly formed elementary schools.

Health Start, a summer medical screening program for impoverished children, was introduced in 1970. In addition to general medical screening, children received referrals, dental care, and follow-ups throughout the year. This program was in operation for 2 years but was discontinued for lack of success. Three years later, Home Start was initiated, providing home-based Head Start services by paraprofessionals, the rationale being that Head Start skills could be brought home and

delivered to parents and other siblings. This program was particularly well received in rural areas where great distances to child care centers hindered families' participation. There are now more than 500 Home Start sites in operation, and more than 47,000 children have participated in Home Start services.

In 1991, the Head Start Transition Project received funding to partner Head Start with elementary schools to provide services in four different areas: (1) developmentally appropriate and continuous Head Start curriculum, (2) health services, (3) facilitation of parental involvement, and (4) social services to participating families. This program operated in 32 sites. Although this program is no longer active, the effort to coordinate transitional support to Head Start children is still a priority.

In 1995, the first Early Head Start grants were awarded to provide services for pregnant women and children birth to age 3. Four years later, Early Head Start served about 45,000 children through such program services as comprehensive early child development, health, and family support in both home- and center-based care. Thus far, the research evaluation conducted by Mathematica Policy Research, Inc. shows that Early Head Start is improving cognitive, language, and social-emotional development in the participants at age 3, and increasing parental involvement.

EVALUATION OUTCOMES

Because Head Start is a nationally recognized, federally funded preschool program, there are plentiful reasons to study the magnitude of its effects on the children and families it serves. Over the years, many notable studies have been undertaken. The first studies evaluating the efficacy of Head Start primarily focused on "graduates" between first and third grade. The Westinghouse National Evaluation Study in 1965 matched former Head Start participants in grades 1 through 3 with classmates from similar family backgrounds. This was a quasi-experimental study that tested the academic achievement scores of these children. Two investigations with similar designs and findings include the Educational Testing Service (ETS) Longitudinal Study in 1969 to 1971 and the New Haven Head Start Study, 1968 to 1969. Finally, the National Longitudinal Survey Child-Mother (NLSCM) conducted between 1979 and 1989 compared language test scores of children who attended Head Start against those of their siblings who did not attend.

Regarding long-term effects, the general consensus of these studies was that Head Start graduates had higher achievement test scores than non–Head Start participants in grade 1, but that this difference was no longer significant in grades 2 and 3. This phenomenon has been termed the *fade-out effect*, whereby the cognitive benefits of Head Start are evident immediately but diminish gradually within 1 or 2 years. The NLSCM study found the fade-out effect among African American and white children, but actually found a "fade-in" effect for Latino children. It appeared that, for Latino children, having attended Head Start produced a progressively beneficial effect on academic achievement.

Despite the immediate benefits associated with Head Start, the fade-out effect brought into question the value of the program. In 1985, the U.S. Department of Health and Human Services issued a contract to synthesize the results of 210 Head Start research studies. The findings confirmed the fade-out effect, concluding that immediate cognitive gains were significant, but diminished within 2 years after exiting the program, in the absence of intervention beyond preschool.

Simultaneously, Head Start advocates began questioning the legitimacy and validity of the research being conducted. For instance, the Westinghouse National Evaluation Study was conducted 3 years after Head Start was initiated; thus, the non–Head Start subjects were assigned to the control group *after the fact*. Typically, an experimental study assigns participants to each group randomly *in advance,* to avoid bias in interpreting the results. Consequently, it is difficult to conclusively attribute any effects—favorable or otherwise—solely to the Westinghouse intervention. Second, the instruments used to measure the social competence outcomes were not validated ahead of time. Unlike the well-standardized cognitive competence measures, the measures of attitude or emotion were developed informally by the evaluators of the program, which elicited substantial criticism from experts. The research findings also brought into question whether the outcomes measured could truly determine the efficacy of intervention programs. Ultimately, certain outcomes may be more useful in shaping public policy (e.g., cognitive and social competence), and other outcomes may provide more useful feedback for curriculum improvements, medical and dental care, and parental involvement. It is worth noting that the bill for the Head Start program—now approximating $7 billion annually—must be paid through legislative action, an intensely political enterprise.

Given the limitations of previous research, Head Start supporters began looking to other program evaluations. Between 1984 and 1993, the High/Scope Perry Preschool Project conducted follow-ups of its participants and nonparticipants at ages 19 and 27. Regardless of the outcomes in the elementary school years, the follow-up results indicated that the preschool participants showed increased employment and graduation rates, less dependence on public services, and reduced crime and arrest rates, when compared with nonparticipants. These significant findings were dubbed the *sleeper effect*, meaning that the effects of the preschool program became evident later in the participants' lives, most prominently in the areas of social behavior, self-sufficiency, and moral conduct.

Owing in large part to the notoriety of the Perry Preschool Study, the Long-Term Benefits of Head Start study (LTBHS) was initiated in 1987 and 1988. In this study, former Head Start children were followed up 17 years after participation in the program and compared with non–Head Start subjects of the same age in Colorado and Florida. Compared with the nonparticipants, Head Start graduates achieved significantly higher elementary school grades and showed a trend toward higher rates of general equivalency diploma (GED) or high school completion, employment, and enrollment in school. However, there were no significant improvements regarding teen pregnancies, use of public assistance, or rates of crime and arrests.

A subset of the Florida Head Start sample received a model Head Start program based on child development theory, known as the High/Scope preschool model. This subset of Head Start graduates was compared with the Head Start graduates who received the regular curriculum, and significant improvements were found regarding grades in elementary, middle, and high school, and in lower crime and arrest rates. Although no significant improvements were found in rates of GED or high school completion, employment, enrollment in school, or teen pregnancies, the significant findings did, to some degree, replicate the Perry Preschool finding that preschool intervention has lasting effects beyond the commonly measured domains of cognitive and social competence in early childhood.

Several research studies were initiated to evaluate programs developed as offshoots of Head Start. In 1968, a study of program effectiveness for Project Follow Through found only moderate effects on the children's academic achievement. However, these results were not surprising, given the haste and disorganization in launching the program and the lack of curriculum consistency across sites. Home Start was evaluated after its inception in 1972, and the results indicated that the program was equally effective in all areas, except that it did not provide the same quality of health services as center-based Head Start. Finally, the evaluation of the Head Start Transition Project determined that participating children were able to reach national norms in most academic areas.

SOCIAL AND POLICY IMPLICATIONS OF EVALUATION FINDINGS

Since its inception, Head Start has received strong financial support from the federal government. The congressional appropriation increased dramatically from $96.4 million in fiscal year 1965 to $349 million in 1967, owing to the early enthusiasm for the program. However, the ensuing negative evaluation reports led Congress to decrease the appropriation to $325 million in 1970. At that time, the Office of Management and Budget floated a plan that would have phased out Head Start over a 3-year budget cycle. This phase-out plan never took place, owing to protests from parents and other advocates who supported Dr. Zigler's arguments. He acknowledged that, although it is straightforward to base policy decisions around easily measurable effects like achievement scores, the importance of other Head Start objectives may be overlooked, such as improved health, promotion of social skills and moral conduct, and reduction in arrest rates and crime. Not only did the phase-out plan not take place, but also, in 1971, Congress appropriated $35 million more than the previous year's allocation.

Between 1977 and 1983, the Consortium for Longitudinal Studies (CLS) published a series of reports reviewing the long-term effects of 11 preschool interventions, including Head Start. CLS has been pivotal in publicizing the importance of early childhood interventions and in drawing outside support. The perspective that emerged from those reports drew on the plausible argument that the long-term effects of early childhood interventions do not stand alone. Rather, these interventions have an interactive relationship with their social context and with the families and educational experiences surrounding the children. During the Carter administration, from 1977 to 1981, the annual appropriation for Head Start nearly doubled, and in 1984, the Head Start budget exceeded $1 billion dollars. The total appropriation for Head Start in fiscal year

1995 was $3.5 billion; it rose to $5.3 billion in FY2000; and it reached $6.8 billion in FY2004.

Most of the congressional appropriation for Head Start is awarded to public or private nonprofit agencies to fund local Head Start projects. Grants are awarded by the Department of Health and Human Services regional offices, except for the American Indian and Migrant programs, which are administered in Washington, D.C. The remaining funds are used for training, technical assistance, research, demonstrations, and program evaluation.

In addition to policies affecting Head Start, the following two examples illustrate the profound effect that Head Start has had on policy decisions throughout its existence. In 1971, the Comprehensive Child Development Act was created to provide access to quality child care for all working mothers. Low-income mothers would receive the service for free, whereas other families would pay for the service on a sliding scale. Simultaneously, the Nixon administration was working on its welfare reform package known as the Family Assistance Plan. The plan was designed to provide women with job training and child care in order to reduce their dependence on welfare. The next step in support of the Comprehensive Child Development Act and the Family Assistance Plan was to specify what would be considered quality child care. Dr. Zigler and his staff drafted a set of federal standards based on their experience with Head Start, and Secretary Elliot Richardson approved those standards. Although the two bills failed to pass, the National Association for the Education of Young Children (NAEYC) eventually adopted the standards proposed by Dr. Zigler in its system for evaluating and credentialing child care programs across the country. NAEYC is still in existence and continues to influence child care standards across the nation.

FUTURE DIRECTIONS

Head Start has remained active for almost 40 years and receives significant funding from both federal and state sources. This investment in Head Start is founded on the complementary relationship between program evaluation results and public policy. In order for Head Start to survive in the future, this relationship must be nurtured, to ensure that current research appropriately drives future policy decisions. In 1998, Congress authorized the first national evaluation of Head Start (the National Reporting System) since the Westinghouse study, contracting the Administration on Children, Youth and Families (ACYF) to direct the research.

The National Reporting System (NRS) is grounded in President Bush's *Good Start, Grow Smart*, Early Childhood Initiative. It includes provisions in the Head Start Act to create a new national database that monitors the progress of 4- and 5-year-old Head Start children in specific areas of child development. Programs will administer this NRS assessment to more than 525,000 children (all 4- and 5-year-olds) at the beginning and end of the program year, to assess the skills with which they enter Head Start, their levels of achievement when they leave Head Start, and the progress they have made during the year. The assessment information collected through the NRS will be used to strengthen Head Start program effectiveness. This assessment will monitor the following five learning indicators, as mandated by Congress in the Head Start Act of 1998: (1) understanding and using language to communicate for various purposes; (2) using increasingly complex and varied vocabulary; (3) in the case of children whose native language is not English, progressing toward acquisition and mastery of the English language; (4) identifying at least 10 letters of the alphabet; and (5) awareness of numbers. To counter the skepticism generated by the flaws in the Westinghouse study, the NRS evaluation has employed an experimental design using random group assignment and validated performance measures.

Although it is still early to evaluate the NRS, it is *not* too early to praise the magnitude of the undertaking or the enormity of its promise for our understanding of early childhood development. This program has the potential to cure a chronic deficiency in our knowledge about children raised in poverty, and about our understanding of what works best, for whom, and under what circumstances to mitigate the pernicious effects of poverty in our nation. That deficiency is the lack of a national database of norms against which to compare developmental progress of poor children in all of the important areas of growth. The cost of the NRS program and the scope of the undertaking are simply staggering, but the potential benefits from the program, if well executed, are even more impressive.

The future of legislation pertaining to Head Start is also in transition. The funding of Head Start is gradually shifting to the states, and as a federally regulated program, Head Start must continue to build ties to state and local agencies. Already, most states in the country sponsor similar preschool programs, albeit usually of

lesser cost and sometimes lesser quality than Head Start. Local school districts are also moving in the direction of expanding their preschool offerings, especially for low-income families. Recent changes in our national welfare systems have mandated a high priority on quality child care, in order to support the requirements of further education and employment, especially of low-income mothers. Since 1990, ACYF has financially supported several partnerships between Head Start and state-operated agencies, aiming to coordinate early education, child care, and health care. These partnerships are vital because it has been suggested that the widely documented fade-out effect may diminish if children's educational and social environments improve as well.

There are pervasive and persistently adverse influences on child development that are associated with extreme poverty in our society. Poor American children spend at most 40 of their waking hours in school settings each week, but half again as many waking hours in impoverished homes and neighborhoods that typically breed very different behaviors, attitudes, skills, and values than those promoted in Head Start. Therefore, if children graduate from Head Start but remain in impoverished neighborhoods and enter public schools without *any* compensatory assistance, this would present much greater challenges for those children to make strides academically or psychologically.

A second step that has potential impacts on children's prospects is an alliance with public elementary schools. Developed in 1995 at Yale University, the School of the 21st Century program provides services associated with Head Start to children and families through their elementary schools. Such services include on-site preschool, before- and after-school care, and family outreach. In keeping with the Head Start policy model, the Department of Education funded an evaluation of this program, to be conducted by the Yale Bush Center in Child Development and Social Policy. The results are still pending, and Head Start advocates believe that this will help bridge the transition of Head Start children to public schools.

A prospective policy funded by state and federal agencies that may have an impact on the future of Head Start is the trend toward universal access to preschool education. This may instigate competition between preschool programs, leaving Head Start to defend its need for future funding. Thus, the future of Head Start may lie in targeting the younger age bracket, including infants and toddlers, an effort that is already underway within the Early Head Start program. An evaluation of the effectiveness of Early Head Start is in progress, and results thus far appear promising. In the future, we may see a larger proportion of the Head Start budget shifting toward Early Head Start and other progressive programs in very early childhood.

—Norman F. Watt

See also Early Intervention Programs

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HEALTH INSURANCE

Health insurance often seems confusing and can be difficult to navigate for even the most knowledgeable consumer. It is one of the most talked about topics in political elections and has received considerable media attention because of the rules and restrictions

placed on people who have insurance and the plight of the growing numbers of uninsured Americans.

The primary feature of health insurance is to pay for the cost of medical events that a person cannot afford. Insurance intends to pool for groups of people the financial risk of expensive, unforeseen medical events. Lately, however, the trend has been to use health insurance to pay for routine and ordinary health care as well as those catastrophic events. As a result, the cost of health insurance is rising for everyone.

Insurance as a concept is easy to understand. It is simply a mechanism for pooling financial risk within a community so that no single person has to bear the burden of a substantial expense. When members of a community or a company insure against health risk, everyone puts money into a collection, and the cost of their health care is paid for, in part, from that pool. No individual person is responsible for overwhelming medical costs because they all share the burden of each other's costs.

Insurance in practice is more difficult to navigate. To participate in insurance plans, a consumer must enroll in a plan either through his or her employer, through programs run by the federal or state governments, or individually with an insurance company. The enrollee pays a monthly payment called a *premium*, which goes to fund the risk pool. When insurance is accessed through work, the employer frequently pays all or part of this premium, and any remainder is paid by the employee using pretax wages. When insurance is accessed through public programs, little or no money is required of the consumer for the premium; however, funds are deposited by the government to fund a risk pool just the same.

Insurance companies offer different health insurance plans, each of which maximizes benefit or minimizes cost to the enrollee. Often, this means that plans that are the most financially appealing to the consumer because they cost less in premiums will have greater restrictions when the insurance is used and health care is sought. Health maintenance organizations (HMOs), preferred provider organizations (PPO), and point-of-service plans (POS) are plans that cost less in premium dollars than traditional, more expensive health insurance plans, but they also have more restrictions and guidelines that the consumer must follow in order for their care to be paid for by the insurance plan. The rules and guidelines of these types of insurance plans are often the basis of many complaints about health insurance today. It seems that in theory, health care is easily accessed and less costly with these types of health insurance plans; however, in practice, people find the rules and restrictions difficult to manage and to navigate.

Once enrolled, an insured person is able to go to any provider such as a doctor or hospital that accepts their particular insurance plan, and the provider will be paid for the care delivered by the insurance company. Providers are free to accept or to deny particular insurance plans, and consumers are usually provided with a list of participating providers by their insurance company. Also, depending on the rules of any particular insurance plan, an annual deductible and a co-pay or co-insurance may also be required of the enrollee. That means that the consumer is responsible for paying for a portion of the cost of the care out of his or her own pocket in addition to what the health insurance plan will pay for the care that is provided. It is important to understand that in most instances, insurance does not cover the entire portion of the cost of care, and consumers are increasingly being called on to make health care decisions based on greater responsibility toward the cost of their own care.

Access to health care providers looks about the same for anyone who has insurance, whether it is private, employer-sponsored insurance, or a public insurance program. However, if a provider is unwilling to accept your health insurance plan, then you must either find another provider who is willing, or pay for the care out of your own pocket.

People without health insurance have much greater difficulty gaining access to providers who are willing to treat them. Most providers will accept full cash payment from individuals without health insurance; however, the cost of health care today is much more expensive than most people can casually afford. Most people today are unaware of the full costs of an office visit, for example, and are often unable to pay unexpectedly for such visits out-of-pocket. As a result, uninsured people tend to go without medical care until such time as their illness or disease creates a major disturbance in their lives. Alternatively, they access health care through the emergency room of the local hospital. Either instance illustrates a critical issue in our health care system today. If someone waits too long to be treated because they lack health insurance, then their illness can be far more serious and more costly to treat when they finally do seek treatment. Also, when someone who is uninsured needs to access basic, routine health care through the emergency room, then the cost of their care is much greater, and the encounter is wasteful of health care resources. Either way, prompt,

appropriate, and affordable health care is denied through a lack of health insurance.

Most Americans, about 60% of the population, get health insurance through their employer, whereas about 25% of the population gets health insurance through the federal government (Medicare) or the state government (Medicaid, State Children's Health Insurance Program [SCHIP]). Also, at any given time during a year, there are between 20 and 40 million people, or up to 15% of the population, who are without health insurance, either because they are between jobs, their employer does not offer health insurance as a benefit, or they are unable to purchase health insurance on their own. Many of these uninsured Americans are working, wage earners; some will pay a substantial portion of their total income on medical costs out-of-pocket.

Women and children who are unable to access health insurance through an employer program, or for whom insurance is too costly to purchase, are often eligible for health insurance through state-run programs such as Medicaid and SCHIP. Medicaid is a state-run insurance program that provides health insurance to low-income families. Families must meet income guidelines proposed by their state to qualify for Medicaid insurance. Once enrolled in Medicaid, recipients are covered for a broad range of health care services from providers willing to accept Medicaid. The federal government outlines a list of required services that Medicaid will pay for from willing providers. These include, among others, inpatient and outpatient hospital services, physician services, prenatal care including nurse-midwife services, vaccinations for children, nursing facility services, family planning services, home health services, laboratory and x-ray services, pediatric and family nurse practitioner services, and early periodic screening, diagnostic, and treatment services for children younger than 21. Some states also elect to provide optional services, including prescription drugs and optometrist services, among others.

For little or no cost to families who make too much to qualify for Medicaid, but for whom health insurance is beyond their financial reach, SCHIP is a new program that enables states to insure children younger than 19 years for doctor visits, hospitalization, emergency room visits, and immunizations. Exact program components vary from state to state, and information about coverage can be obtained from any state's Department of Health.

Nationwide, the SCHIP outreach and enrollment activities have increased the screening and evaluation of many uninsured families, and many states have reported that SCHIP has had a significant impact on their Medicaid programs. The result has been the identification and enrollment of children who may have been eligible for some time into either the Medicaid or SCHIP programs.

Even with these significant improvements in access to health insurance for our nation's children, however, a significant number of children across many states continue to remain uninsured. During the 10-year period from 1988 to 1998, the proportion of children insured by Medicaid increased 4.2% (from 15.6% to 19.8%), and yet in the same time period, there was also an increase in the number of uninsured children (from 13.1% to 15.4%). It seems that the changes facing employer-sponsored health insurance in the quest to contain the costs of health insurance are substantially cutting the insurance benefits to many employed people. As a result, employed, previously well-insured Americans will become less well insured or even uninsured. Development of alternative insurance programs for the United States' most vulnerable populations will continue to be an important issue at the state level. However, while states continue to test the viability and success of the Medicaid and SCHIP programs, it will not be without increasing cost, which the taxpayer will have to bear.

—Karen M. Edwards

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HEMOPHILIA

Hemophilia is a blood disorder characterized by unusually low levels of clotting factor, which prevents normal blood coagulation. As a result, people with hemophilia bleed for longer periods of time but not at a faster than normal rate. It is a recessive genetic disorder that is carried on the X chromosome, and so it affects predominantly males. The diagnosis of hemophilia in women is very rare. There are two forms of hemophilia. Hemophilia A results from a deficiency in clotting factor VIII, and hemophilia B results from a

factor IX deficiency. Hemophilia A is more common, occurring in 1 in 10,000 male births, whereas hemophilia B occurs in about 1 in 34,500 males. About one third of hemophilia cases occur through spontaneous mutation with no inheritance of the gene.

Severity of the disorder can be classified as mild, moderate, or severe with differing symptoms. Symptoms of hemophilia include pain, bruising, spontaneous bleeding, bleeding into muscles and joints with associated pain and swelling, blood in urine or stool, and prolonged bleeding from minor cuts or abrasions. People with mild hemophilia are most likely to experience problems due to surgical procedures or major injuries, whereas people with severe hemophilia may experience spontaneous internal bleeding into muscles and joints.

For some cases of hemophilia, treatment consists of regular injections of the missing clotting factor. Mild cases of hemophilia may require injections only when bleeding occurs. The clotting factor either comes from human plasma or is made synthetically. Because so many donors are required to process one dose of factor, transmission of viruses from donor to recipient was a significant problem until the early 1990s. The risk involved in contracting viruses through human clotting factor has been drastically reduced in recent years, practically eliminating the risk for contracting human immunodeficiency virus (HIV) and hepatitis from clotting factor derived from human plasma.

Psychological functioning of children with hemophilia has been found to be similar to children with other chronic illnesses, with a display of more internalizing and externalizing behavioral disorders. However, there are certain aspects of hemophilia that are quite different from other illnesses. For instance, psychological difficulties may arise from the restrictions that people with hemophilia may have to place on their lifestyle. In particular, people with hemophilia have limitations and require close monitoring with regard to physical activity. Participation in contact or high-impact sports can potentially be very dangerous for a child with hemophilia, owing to the likelihood of joint and muscle bleeds.

Children may become frustrated and bitter with the limitations of hemophilia. Children may have to repeatedly explain to other children why they cannot be involved in activities. People with more severe cases of hemophilia have greater limitations and can often experience more loneliness. Education of the family and friends of those with hemophilia can help boost the self-esteem of those suffering from hemophilia by creating a greater understanding of the illness. Children can also be helped if alternative activities are provided for them. As children enter into adolescence, they face not only the same psychological issues but also possible physical changes as a result of the bleeding. Those with hemophilia may have to deal with medical issues before they are developmentally ready and in some cases before they can adequately care for their illness. Fortunately, treatment centers have began to address these issues by creating a multidisciplinary approach that stresses education, proper medical care, and adjustment to living with a chronic illness.

—Lana S. Olivo and Ric G. Steele

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HETEROSEXUALITY

Heterosexuality is ubiquitous to modern Western sensibilities. It is often seen as the natural, timeless, and logical arrangement of the mating pair bond. For most people, trying to describe the role of heterosexuality in life is like trying to describe walking upright or using opposable thumbs; you never really think about it until it is challenged. Heterosexuality is not even questioned unless the concepts of homosexuality or bisexuality are mentioned. However, as recent as a little more than 100 years ago, if you had asked someone if they were heterosexual, they would either not know what you were asking or be highly offended.

The term *heterosexuality* has it origins in pathology. It first appeared in print in medical journals as a malady related to the obsession with nonprocreative

sexual activities, just as homosexuality was mentioned as obsession with same-sex (obviously nonprocreative) activities. It was not until the 1930s that heterosexuality began to lose its stigma and take on its mainstream position in the Western consciousness.

Even though the term heterosexuality may have a recent and varied history, the concept is older than recorded history itself. As soon as men and women began to divide themselves into separate spheres of activity and the realization that sexual intercourse was how procreation was achieved, the concept of heterosexuality was born. This concept is rooted in sexual duality of the binary sexual categories of male and female.

Originally tied to reproduction and division of labor, heterosexuality has grown to encompass attraction or desire, behavior, and identity.

ATTRACTION

Heterosexuality is often currently defined as "sexual orientation toward persons of the opposite sex." This definition starts with the premise that there are only two sexes, male and female. However, in nature, there are many species of plants and animals that are hermaphroditic, possessing the gonads and sex organs of both sexes. There are also some insects and reptiles that are single sexed. Even in the human population, we find that about 1 in 2,000 births has some form of sexual ambiguity that makes it difficult to determine the child's sex at birth.

However, for most humans and animals, there are just two sexes. Based on the sexual reproduction paradigm, roughly half of the species carry gonads that produce eggs, and the other half carry gonads that produce seeds or sperm necessary to fertilize the eggs and produce genetically variant new offspring. It is this drive to reproduce that is at the center of the heterosexual paradigm. To reproduce, an animal (or human) with the egg-producing gonads must unite with a partner who carries the sperm-producing gonads and join in a sexual union. Likewise, the same drive exists in the sperm-producing creature to locate and secure an egg-producing partner to accept his sperm and thus produce the next generation.

For many animals, the quest stops there. Once the eggs are fertilized, interest in the opposite sex ends. However, in most warm-blooded animals, at least one partner (usually the egg-bearing one) remains behind to nurture the offspring. In other cases, the partners form a pair bond; the pair either takes turns in caring for the offspring, or one partner cares for the young while the other gathers resources such as food and provides protection for both the partner and the offspring.

This pair bond is what is central to the concept of heterosexuality. Among humans, the pair bond exists even when procreation is not the central concern. Human pair bonds can develop before procreation is possible and continue long after reproduction has ceased. Even when reproduction is a prime concern, the heterosexual union is often more than just the matching of gonad-producing organs; there is also a balance of sexual energies that is frequently sought.

Thus, the attraction of a mate takes on the quest for certain physical and relational traits that one would find desirable in a mate. Interestingly, even in modern information age societies, many of the traits that are considered most desirable in a mate are those traits that would be advantageous in producing and rearing offspring. Often men are attracted to physical attributes that indicate a woman is healthy and likely to be able to bear children. These include things like clear skin, youthful appearance, widening at the hips, developed breasts, and so forth. Women also seek attributes in men that might indicate good genes but also attributes that indicate that the male has access to resources that could make him a good provider for her and her offspring. Women will also look for men that make good companions. Although these markers of attraction may be conscious or unconscious, they are central to heterosexual attraction.

BEHAVIOR

If the most common definition of heterosexuality is sexual orientation toward the opposite sex, the second most common definition could be "sexual activity with the opposite sex." Originally, this activity focused on the procreative nature of sex; that is, sex was for reproduction. Thus, activities associated with sex were supposed to be for producing offspring. There were (and still are) many ancillary activities that go along with producing and rearing offspring that have led to a division of labor between the sexes. Because bearing children is the sole province of the female, the male then has been relied on to assist by providing food, shelter, and protection for the mother and offspring. In fact, during the gestation period, or pregnancy, the human female becomes more incapacitated and thus more dependent on the male or at least the extended family.

Even when she has recovered from the delivery and has regained much of her strength, the human female still needs assistance in caring for the newborn, owing primarily to the immature development of the human offspring. It takes several years before the human child can function independently, and even then the child still requires protection and guidance in social and intellectual development.

Because nurturing this young child typically falls to the female, providing resources and protection falls to the male. This has led to different realms of activities for each sex tied to the maintenance of the child and the social unit, the family. As humans advanced from wandering hunter-gatherer societies to agrarian ones, the realms of activities remained, even as the activities themselves changed. The main difference is that in agrarian societies, the activities occurred closer to home, and thus the male was around more often. Also, because the types of activities changed, some no longer requiring brute strength, the lines between male and female behaviors also began to change.

It is at this point that division of labor took on a more sociological meaning, rather than being based primarily on physical abilities and attributes. Thus, activities of men and women became proscribed as inappropriate for one sex or another. This gave rise to the concept of gender role—that is, the assignment of a set of activities to males and calling it *masculinity* and another set of activities to females and calling it *femininity*. From this time to the present, the division of heterosexual behavior has taken on hegemonic overtones concerned not with simply providing for the family but also with maintaining the social structure of the family and larger society (as locally arranged).

Each society has its own definitions of which activities are relegated to women and which to men. In most patriarchal societies, men who engage in work deemed "women's work" are mocked, and it is considered an affront when women venture into areas reserved for men. In both cases, the person's status as a man or woman is frequently called into question when this occurs. This is true even when the behaviors have little or nothing to do with the reproduction or rearing of children.

Even in today's postindustrial society, the vestiges of this distinction remain. Although men and women can engage in activities previously deemed inappropriate, they do so at threat to their status as masculine or feminine and, in some cases, as a direct threat to their very lives. In the United States, it is considered perfectly masculine for a man to cut men's hair for a living and be called a barber. However, if a man chooses to focus on women's hair and be a beautician or stylist, his masculinity will be called into question. Likewise, a woman, if she is strong enough, can do construction work or even drive 18-wheeled delivery trucks, but there will certainly be questions raised about her femininity.

This is true for a whole host of activities, even leisure activities. Men are still encouraged to engage in high-energy, even dangerous, leisure activities, whereas women are often relegated to the role of observer and supporter. Leisure time activities that are more home centered are still the realm of women. Even though it has been some 40 years since a retired professional football player mentioned publicly that he enjoyed knitting as a form of relaxation, there has been no mass movement of heterosexual men to take up the craft. Likewise, quilting, cross-stitch, and beadwork are still seen as feminine, and males who participate in these activities have their masculinity questioned. The same could be said of women who engage in woodworking and metal die and tool work. Woman can and do participate in these activities, but not in large numbers and not without questions being raised about their femininity.

Finally, when we move back into the area of sexuality, the appropriate roles for men and women are also dictated. The influence of Victorian era mores still lingers in modern ideals about appropriate sex behavior. Men are supposed to be the pursuers and women the prize. Men are to be the aggressors and women more passive. Men who have many sex partners are raised in esteem, whereas women who engage in similar behavior are looked down on. These attitudes are changing slowly but still persist.

IDENTITY

Throughout much of Western history, it was assumed that boys grow up to be men and girls grow up to be women. Occasionally, there would be a notable person who attempted to buck this trend, but for the most part, men were considered men and women considered women. Even if they engaged in what would be considered by today's standards homosexual behavior, they were still considered to be men and women and for practical purposes heterosexual. That is to say, that merely participating in certain acts did not change one's identity.

It was not until the late 19th century when science turned its eye to the study of the human mind that the discussion of individual differences emerged and that

homosexual behavior began to be seen as more than just activity but an identifiable malady. Thus, males with a propensity toward same-sex erotic behavior were seen to be suffering from sexual introversion. As with the naming of many diseases, the person soon became the disease. Men with this "condition" soon became known as "introverts." The focus was still on behavior, but the behavior now defined the man.

Recall that during this time, even heterosexuality or nonprocreative sex was considered a malady. It was the expansion of the "sex for pleasure" ideology and possibly one entertainer's play on words that helped to usher in the modern heterosexual identity. By proclaiming to be a raging heterosexual in a vaudeville routine, a comedienne helped bring heterosexuality out of the closet, so to speak. The drive and growth of the identity was probably more as a reaction to the growth of homosexuality as an identity. After the Kinsey report revealed that a large number of men have participated in at least one homosexual act in their lifetime, many men felt driven to proclaim their heterosexuality and deflect any doubt by engaging in masculine activities and establishing a solidly heterosexual lifestyle.

This pressure greatly increased after 1969, and the Stonewall riots gave rise to "gay pride." This, along with the women's liberation movement, challenged men who were not gay, or who greatly feared even the remote possibility of being mistaken for homosexual, to assert their heterosexuality. During the past 40 years, there has been a decided shift in which activities are considered masculine and which activities are considered feminine. Thus, it has become increasing difficult for males in the United States to firmly establish their heterosexual identity. For women, too, there has been some confusion in this area. Does she really want to give up the privileges that came with being able to stay at home with the kids or the other benefits of the previous gender role expectations? Does he want to take on the roles that men have played for the past 150 years of the industrial age and join the "rat race"? One response for both sexes is to retreat to the standards of an earlier day. Try to reestablish the nuclear family with mom at home and dad in the workplace. In some cases, this has caused men to become misogynistic and shun all things feminine. In other cases, society has had to redefine what it means to be a man. Taking care of one's family has become a hallmark of "manhood" on par with obtaining sex from several women, being strong and athletic, or earning lots of money.

As the earning power of women has grown and some women have moved into becoming the chief wage earners in their households, some men have become the caretakers of children. These men fight a daily battle to maintain their identity as virile heterosexual males. It is not enough to say that you are married and that you have fathered offspring (although for some men that is enough), men in the 21st century are having to reestablish what exactly is the masculine identity. In similar manner, women are having to decide just how far they are willing to encroach on previously defined male territories and how much traditional femininity can they bring along and how much they have to give up. In these days of diminishing division of labor, sex for pleasure versus procreation, and individuals even deciding not to procreate, the definitions of heterosexuality may have to revert to the orientation toward the opposite sex. As acceptance of other forms of sexual relating (e.g., homosexuality, bisexuality, transgenderism) continues to grow, maybe even the ubiquitousness of heterosexuality will wane to the point at which it is just one option among many.

—Herbert L. Coleman

See also Homosexuality

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HETHERINGTON, E. MAVIS (1926 –)

Eileen Mavis Hetherington is Professor of Psychology, Emeritus, at the University of Virginia. Her distinguished career of more than 50 years is highlighted by contributions to research on childhood psychopathology, personality and social development, and stress and coping, but she is perhaps best known for her work on the effects of divorce and remarriage on child development.

Hetherington received her PhD from the University of California at Berkeley in 1958. She taught at Rutgers University and then at the University of Wisconsin before arriving at Virginia. Although she retired in 1999, she has continued to be an active scholar, writing and speaking around the world. Hetherington is quick to note that her accomplishments came at a time when it was not common for women to excel in academia, and that her path was smoothed by her parents, her husband John, and their three children.

Hetherington began her research career looking at sex role stereotyping in families, documenting fathers' influences on their children. This sparked her research in father absence in the early 1970s. In 1972, she began the 20-year Virginia Longitudinal Study of Divorce. Hetherington and her colleagues reported the somewhat controversial findings that, although divorce is certainly harmful to children, it is not as devastating as most theorists assumed. Her claims that children in divorced and stepfamilies can continue to function within normal ranges continues to provide fodder for discussion, as evidenced by the reaction to her 2002 book, *For Better or Worse: Divorce Reconsidered* (coauthored by J. Kelly). Recently, she collaborated with Robert Plomin and David Reiss on the Nonshared Environment of Adolescent Development study investigating biological influences on family processes and individual differences.

An eminent teacher and scholar, Hetherington has received numerous honors, including the State of Virginia's Professor of the Year award and the G. Stanley Hall Distinguished Scientist award from Division 7 (developmental psychology) of the American Psychological Association (APA) in 1986, the APA's Distinguished Teaching in Psychology Award in 1987, the Distinguished Scientist Award from the Society for Research in Adolescence in 1989, the Distinguished Scientist Award for Research Contributions to Family Therapy from the American Family Therapy Association in 1992, the William James Distinguished Scientist Award from the American Psychological Society in 1993, and the Burgess Distinguished Scientist Award from the National Council on Family Relations in 2000, among others. In 2004, she was awarded the APA's Distinguished Scientific Contribution Award (at the same time, her former student, Thomas G. O'Conner, received the Award for Distinguished Scientific Early Career Contribution to Psychology, a fact that pleased her very much).

—Susan L. O'Donnell

See also Divorce Mediation

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HIGH BLOOD PRESSURE (HYPERTENSION)

High blood pressure (hypertension) is a sustained elevation of blood pressure greater than 140/90 mm Hg. With hypertension, the pressure within the arteries of the body is too high and causes damage to the eyes, kidneys, brain, and heart. The damage can be prevented with proper treatment, consisting of diet, exercise, weight loss, and sometimes medications.

Hypertension affects 50 million Americans (one in four) and 1 billion people worldwide. Of the 50 million Americans with hypertension, 30% do not know they have the disease, and only one fourth sustain adequate blood pressure control (less than 140/90 mm Hg). One reason that people with hypertension may not be aware that they have the disease is that high

blood pressure generally has no symptoms unless it is extremely high. For this reason, it is often called the "silent killer." The first indication of long-standing hypertension may be symptoms of damage already done to the body, such as a stroke or heart attack.

Hypertension increases with age. It is more common among African Americans than whites. As the American population ages and obesity reaches epidemic proportions, the incidence of hypertension is predicted to rise. Obesity is thought to be a major contributing factor to hypertension in children and adolescents, and the incidence of obesity in children has risen sharply in recent years.

CLASSIFICATION OF HYPERTENSION

A blood pressure reading consists of two numbers. The top or higher number, known as the *systolic blood pressure*, measures the pressure in millimeters of mercury (mm Hg) within the arteries when the heart is pumping or contracting. The bottom number, or *diastolic blood pressure*, measures the pressure when the heart is at rest. Elevation of either the systolic or the diastolic blood pressure (or both) constitutes hypertension. Elevation of the systolic blood pressure is associated with more complications than elevation of the diastolic blood pressure. Historically, it was believed that an elevated systolic blood pressure was "normal" as individuals grew older and that an increased diastolic blood pressure carried a worse prognosis. However, recent studies have proved this to be false. These studies show that elevation of the systolic blood pressure causes more damage than elevation of the diastolic blood pressure.

Blood pressure readings in any individual vary depending on time of day, psychosocial factors, and degree of physical activity. One elevated reading does not mean that a person has hypertension. Instead, the average of two or more readings made several weeks apart must be elevated in order to confirm the diagnosis.

Individuals with blood pressure readings averaging less than 120/80 mm Hg are considered to be "normal" or "optimal." Those with blood pressure readings averaging between 120 and 139 for the systolic or 80 and 89 for the diastolic are labeled as *prehypertensive* because about half of these individuals go on to develop hypertension. Stage 1 hypertension is defined as a systolic blood pressure of 140 to 159 or a diastolic blood pressure of 90 to 99. Stage 2 hypertension is blood pressure averaging greater than or equal to 160/100 mm Hg (for either number or both).

CAUSES AND RISK FACTORS FOR HYPERTENSION

In about 95% of all cases of hypertension, no cause can be found. This type of hypertension is known as *primary hypertension*. In the other 5% of cases, *secondary hypertension* occurs, in which a specific cause can be established and in many cases treated or corrected. After the treatment of secondary hypertension, the person no longer has the disease. Examples of secondary hypertension include pregnancy-induced hypertension, thyroid disorders, and narrowed arteries leading to the kidneys.

Most affected individuals have *primary hypertension.* Although no exact cause has been established, certain risk factors have been identified that are associated with the disease. Individuals who possess one or more of these factors have a higher chance of developing hypertension than those who do not. Risk factors for hypertension include age (hypertension increases with age), gender (hypertension occurs more frequently in men younger than age 55 and women older than age 55), family history of hypertension, obesity, race (African Americans and Mexican Americans have increased rates of hypertension), physical inactivity, smoking and other tobacco use, diabetes, and excess alcohol intake (more than two drinks a day for men and one drink a day for women). Experts disagree on the role stress plays in the development of hypertension. Now it is generally believed that it is not the degree of stress, but how one handles stress, that contributes to hypertension. Although some risk factors cannot be changed, many are modifiable, and altering them can decrease the chances of developing hypertension. For example, if an obese individual loses weight, that person may never have an increased blood pressure.

COMPLICATIONS OF HYPERTENSION

If untreated, hypertension can lead to debilitating complications or even death. In general, the higher the blood pressure, the greater the number of complications in the body. The damage usually occurs in four target organs: the brain, eye, heart and blood vessels, and the kidney.

Brain

Uncontrolled hypertension is a leading cause of stroke in the United States. Sustained high blood pressure weakens the walls of arteries in the brain

causing a rupture of a blood vessel. This rupture causes a cerebral hemorrhage or stroke. Hypertension also causes hard, rough, irregular deposits on the interior of arteries. These rough areas promote the formation of blood clots, which can block the blood supply to certain areas of the brain and cause a stroke.

Eye

Tiny blood vessels in the back of the eye (retina) can rupture with uncontrolled hypertension, leading to decreased vision or blindness. Individuals with hypertension should have a dilated eye exam by an ophthalmologist at least once a year to determine whether damage is occurring. Laser treatment can often correct this condition.

Heart and Blood Vessels

Uncontrolled hypertension can lead to a heart attack or heart failure. When the blood vessels become damaged with hardened and rough deposits (called *arteriosclerosis*), blood flow in the heart and the rest of the body decreases. The heart must pump harder to meet the needs of the body. Eventually, the heart enlarges to try to meet these demands, and it may become exhausted and fail to pump adequately. This condition is called *heart failure*. Symptoms of heart failure include shortness of breath, cough, and swelling of the legs.

When the blood vessels in the legs are narrowed, the person may experience pain in the leg muscles when walking. The pain may then disappear with rest. Narrowed arteries in the neck vessels promote the formation of clots, which can travel to the brain and cause a stroke.

Kidneys

Hypertension can cause narrowing or rupture of blood vessels in the kidneys. When this happens, the kidneys are unable to filter wastes and kidney failure may result. The person will need dialysis (removal of body wastes by a machine) several times a week or kidney transplantation.

TREATMENT OF HYPERTENSION

Although hypertension can cause life-threatening damage to the body, treating and controlling hypertension lessens or eliminates complications. The goal of therapy is to reduce death and disability by sustaining a blood pressure less than 140/90 mm Hg. In people with kidney disease or diabetes, the goal blood pressure is less than 130/80 mm Hg.

To attain these goals, the person with hypertension should immediately begin lifestyle modification efforts: consume a diet low in sodium and rich in potassium and calcium, stop using tobacco, exercise 30 minutes a day, and consume moderate amounts of alcohol. Often, lifestyle modifications alone are enough to bring the blood pressure down to the goal. But if they do not, medications may be added. Several types of antihypertensive medicines effectively reduce blood pressure. Medication selection will be based on several factors, including the presence of any other diseases, such as diabetes. Often, a diuretic, a medicine that reduces fluid in the bloodstream, is the first one chosen. Most people require two or more types of drugs to reach the target goal. These medications do not cure hypertension, but they lower the blood pressure so that damage to the body does not occur. Therefore, blood pressure medications must be taken for life.

The evidence for treating hypertension to avoid complications is quite compelling. Why, then, do many individuals remain untreated or undertreated for hypertension? First, they may not know they have the disease. They do not feel ill because there are usually no symptoms of hypertension. Next, people with hypertension may not be able to afford the medications. Many people in the United States lack adequate health insurance and must pay full price for all prescriptions. These can be quite expensive in some cases. Sometimes, blood pressure medications make the person feel weak or dizzy. Because most people do not feel ill to begin with, they see no reason to take a medicine that may make them feel bad. Then, many people fear impotence from taking blood pressure medications. In fact, the incidence of this side effect is extremely low. If it does occur, the category of medicine can be changed to another type less likely to cause problems.

Adequate public education should focus on the dangers of hypertension and the lifestyle modifications to prevent it altogether. Screening programs should target persons of lower socioeconomic status who rarely seek health care because they lack health insurance. These measures are the best preventive health care to avoid damage from this very common disease.

—Hannah R. DeToma

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HIGH-RISK INFANTS

Tremendous advances in medical technologies and the emergence of neonatology as a medical specialty have led to the increase in the number of surviving high-risk infants. The developmental status of these children is of great concern to a wide range of professionals. Special educators, school psychologists, developmental psychologists, early childhood educators, and speech and language pathologists are now dealing with a new category of special children. Although the physician is primarily concerned with mortality and morbidity factors, other professionals are interested in developmental performance, family concerns, speech and language development, and later school achievement.

DEFINITIONS, FACTORS, AND INCIDENCE

The term *high risk* encompasses a class of infants who have been exposed to any one of a number of medical factors that may contribute to later developmental delay. These are infants who have been subjected to a potent array of potentially debilitating conditions. Children are identified as being at high risk for developmental difficulties if they experience problems before, during, or after birth that are known to be associated with later difficulties in development. Reviews of the high-risk population can be confusing because of the multiple and overlapping factors that place an infant at risk.

Clarification of Terminology: Birth Weight and Gestational Age

Gestational age and birth weight are most often mentioned in high-risk issues and are defined using World Health Organization criteria. These are barometers for developmental risk and provide an objective means of establishing risk status. A full-term infant is one born between 37 and 41 weeks of gestational age, and infants who are born before 37 weeks of gestational age are defined as premature. Premature infants usually weigh less than 2,500 g (5 lb, 8 oz) and constitute 12% of all births in the United States. Infant mortality rises from five times normal at 37 weeks of gestational age to 45 times normal at 32 weeks of gestational age. Most of the problems associated with prematurity occur in infants with birth weights of 1,500 g (3 lb, 5 oz) or less, usually in those born at less than 32 weeks of gestational age. Incidence rates for neurological and developmental delay for this group range from 18 to 80%, depending on the assessments used.

Birth weights of less than 2,500 g are labeled low birth weight, and very low birth weight is designated for infant weights less than 1,500 g. Together, birth weight and gestational age provide a more accurate means of determining an infant's risk status. Infants born before term are usually also low in birth weight. It is important to distinguish between those infants whose birth weight is close to what would be expected, given their early delivery date, and those whose weight is lower than would be expected. In addition to classifications of appropriate for gestational age (AGA) and low birth weight (LBW and VLBW), another classification of small for gestational age (SGA) combines the two terminologies. Full-term infants may also be SGA, and therefore at risk for postnatal difficulties. Risks are greater for SGA babies than for babies born early but appropriate in size. Generally, the risk for infant mortality increases as birth weight and gestational age decrease.

Extreme prematurity and very low birthweight are known to be associated with developmental problems. Developmental problems may be temporary delays or impairments associated with illness or environmental conditions, or they may be indications of long-term developmental conditions. Researchers have noted that roughly 15% to 40% (depending on how the group is selected and what kind of problems are considered) of extremely premature infants have

significant, long-term medical or developmental problems.

In summary, a high-risk infant is an infant who, because of low birth weight, prematurity, serious medical complications, or adverse environmental conditions, has a greater than average chance of displaying developmental delay or later cognitive or motor deficits or a combination of these in the neonatal or postnatal period. The definition of the risk is necessarily broad because there is increasing evidence that the quality of familial, medical, therapeutic, and educational care that is provided to the child immediately following birth has great influence on the quality of that child's life.

Incidence of High-Risk Infants

Before the advent of the neonatal intensive care unit (NICU), the risk for neonatal death was 30 times greater for low-birth-weight infants. The NICU has greatly modified the concept of risk because many more infants now survive because of the environment it provides immediately following birth. This is reflective in the changes from neonatal mortality statistics (death within the first month of life) in the 1960s (21 deaths per 1,000 births); the 1970s (15 deaths per 1,000 births); the 1980s (18 deaths per 1,000 births); and the 1990s (5 deaths per 1,000 births). The creation of the NICU has reduced the neonatal mortality rate but at the same time increased the number of surviving infants who are at risk for developmental delays. Saving very small and very sick infants results in a greater incidence of handicapping conditions. Estimates of incidence of high-risk infants range from 5% to 15% of all newborns, depending on the classification criteria. The inclusion of congenital anomalies in the description helps to differentiate between earlier and later babies, with the incidence of anomalies at 2.3% for babies born at 40 or 41 weeks and 30% for babies born before 28 weeks of gestation.

Infants at risk for delay also tend to come from nonwhite families, and this is related to socioeconomic status. For example, in the new millennium, black infant neonatal mortality rates (13%) continue to be almost twice the rate of white infants (8%). These statistics reflect the lack of prenatal care available to low-income families in the United States as well as the risk factors related to mother's age and behavior during pregnancy; these will be discussed later in this entry.

Table 1 Survival Estimates for Infants in Intensive Care

Completed Weeks of Gestation at Birth	*Survival (%)*
21 and less	0
22	0–10*
23	10–40
24	40–70
25	50–80
26	80–90
27	>90
30	>95
34	>98

*Most babies born at 22 weeks of gestation are not resuscitated because survival without major disability is so rare.

Survival

Many factors increase an individual baby's chances of survival. The most important of these are the baby's gestational age and weight; the absence of breathing problems; the absence of congenital abnormalities; and the absence of other severe diseases, especially infection. In the smallest infants, gestational age is usually most important because it determines whether the infant's organs, particularly the lungs, have developed enough to allow the baby to live within the limits of current technology.

General estimates of survival for live-born infants who receive neonatal intensive care in the United States in the new millennium are noted in Table 1.

ASSESSMENT

Immediate Neonatal Assessments

There are special exams conducted in the NICU that examine a high-risk infant's behavior to get a picture of how he or she acts and reacts to stimuli and the surroundings. What is learned from the exam can be used to make the baby's world fit his or her own special needs. The exams assess if and how quickly the baby becomes awake and alert; how the baby soothes himself or herself when upset and how easy it is for an adult to soothe the baby; the baby's movement patterns; and how much handling the baby can tolerate without becoming upset.

The Apgar scoring system measures a newborn infant's physical responsivity, development, and overall

state of health shortly after birth. The exam measures heart rate, breathing, muscle tone, reflex response, and color, which reflect the newborn's adaptation to life outside the womb. Because of their early birth, high-risk premature babies are more likely to have lower Apgar scores. Depending on the maturity of the infant's lungs, the newborn may have trouble breathing. Breathing and heart rate can be assessed using a cardiorespiratory monitor. Incubators are also used to warm premature babies who have less body fat.

The Brazelton Neonatal Behavioral Assessment Scale (NBAS) is an interactive assessment of the newborn's behavioral repertoire and neurological responses during the neonatal period. Assessments of physiological, motor, state, interactive and attentional, and self-regulation functions are made, and observations of the infant's communicative signals are included.

Routine developmental screenings during the first 2 years are then plotted from the infant's estimated due date rather than the infant's birth date. The Denver Prescreening Developmental Questionnaire, the Denver Developmental Screening Test, and the Gesell Screening Inventory are all examples of standardized developmental tests. These forms of screening do not replace neurologic examinations. Because of this, standardized examinations, such as the Neonatal Neurodevelopmental Examination, have been developed and are used primarily by developmental pediatricians and pediatric neurologists. The Neonatal Neurodevelopmental Examination assesses postural reflexes and muscle tone, cranial nerve and motor function, sensory responses, and behavior.

Long-Term Assessments

For long-term developmental assessments beyond infancy, it becomes difficult to make a list of definitive developmental milestones that must be met by a certain date. The range of how children do things and when they accomplish developmental tasks becomes broader, largely owing to the increasing influence of culture and experience. The results from testing infants and young children do not reveal how they may do at school age or later in life. There are a number of reasons it is difficult to predict later levels of functioning from testing done with infants and young children, including the fact that the most critical skills tested in older children and adults do not yet exist in infancy.

Another reason why infant tests cannot predict future success involves the importance of later events in determining a child's progress. For example, a young child may have a sensory impairment or motor problem that would profoundly affect performance and limit access to what he or she knows. Later correction or adaptation for the impairment (e.g., glasses, hearing aids, braces) may provide a dramatic difference in the course of the child's progress.

Finally, developmental problems tend to emerge slowly over time as higher levels of brain functioning are called into use. Injury to areas of the brain important for later functioning may not be apparent in an infant or very young child. It is important to look at high-risk children frequently over time to identify delays in their development compared with age mates. Identifying delays early allows for investigation into causes and referral to therapies that may be able to improve or stabilize skills. It is also helpful to compare a child's current performance to his or her previous pattern of development to document the rate of change and recovery being made.

In general terms, developmental evaluations assess how well a child is developing for his or her age. A child's test scores are compared with the average scores for children of the same age. The areas tested include language skills, attention, social behavior, thinking and problem solving, and fine and gross motor skills. These evaluations should also take into consideration the quality of the child's performance, including completion, approach, ease, frustration, and general response, which can help in understanding how the child may be helped most successfully.

PHYSICAL COMPONENTS OF HIGH RISK

The initial physical elements of high-risk status are often discussed as risk factors. Risk factors are defined as characteristics of the infant, the caregiver, or the life situation that have the potential for harming development. When risk factors are in operation, the result may be poor socialization, later problems with mental health, and poor school performance. Risk factors usually occur in multiples, making it difficult to discover the nature of their effect on the infant's development. Certain risk factors tend to be accompanied by specific other factors, which is termed *comorbidity*. For example, a baby with fetal alcohol syndrome is often being cared for by a mother who continues to abuse alcohol, and the mother's negligence and abusiveness are comorbid with the infant's

physical condition. Not all the risk factors for an individual are necessarily present at birth or even at age 2. Although early risk factors can be powerful, later events can play a real part in determining how well a child or adult functions.

Birth Risk Factors

Although many factors may place an infant at risk for developmental disabilities, those related to the birth process are most closely associated with later difficulties. Infants born too soon or too small are at risk for a number of problems. First, they may have difficulty adapting to the postnatal environment owing to their less mature body organs, especially their lungs. Second, they may have restricted growth potential. Third, they may exhibit certain biochemical or physiological disturbances that place them at risk for brain damage. Finally, they may be born into an environment in which certain socioeconomic factors combine with the physical factors of prematurity to double their chances of risk.

Maternal Factors

Maternal histories that include premature births, repeated miscarriage, cervical incompetence, still birth, uterine and placental abnormalities, intrauterine growth retardation, blood group problems, unexplained fetal or neonatal death, and genetic disease or chromosomal disorders may lead to higher risk potentials. Substance abuse (including smoking and alcohol use) and malnutrition are other factors that have been well linked to poor birth outcomes. Medical conditions can also contribute to early labor, including premature rupture of the membranes, which can place mother and baby at increased risk of infection; prolonged labor; uncontrolled delivery; or an abnormal presentation.

Immediate Postbirth Physical Concerns

High-risk preterm infants can experience a higher rate of respiratory, neurological, and gastrointestinal problems that affect general developmental problems. A number of physical functions affect each other, and when one goes wrong, other linked physical problems may follow. Immediate postbirth concerns include the monitoring of immature lungs that are likely to suffer from respiratory distress syndrome and periods of apnea. Respiratory distress syndrome arises when the infant's lungs are too immature to successfully guide the exchange of oxygen and carbon dioxide. Unfortunately, mechanical ventilation, which essentially blows air under pressure into the lungs, can, in turn, cause irritation and long-term lung damage.

Poor fetal circulation may occur, bringing on hypoxia. At times of hypoxia, the infants' body directs blood to the brain and away from the lower part of the body. As a result, the poor supply of blood to the intestines may lead to necrotizing enterocolitis (gangrene of the intestines), which must be treated surgically. Brain damage as a result of brain bleeds can be related to the difficulties in breathing and in blood circulation. Finally, premature high-risk newborns are also likely to have dangerously high bilirubin, which can be treated with medication and with phototherapy using ultraviolet light.

In summary, high-risk infants may spend many weeks in the NICU, where they are necessarily subjected to many invasive procedures; they must often be fed by tube through the nose or mouth, have their breathing artificially assisted, and receive medications or fluids intravenously. Technology has become so advanced that most infants could be kept alive indefinitely with assistance in breathing, artificial feeding, and even kidney dialysis. This calls into consideration difficult questions of whether life alone is the highest priority, or whether quality of life is a greater concern.

In addition to these aspects, there may be complications that some prematurely born children experience in the NICU. Continued short- and long-term health problems for premature infants can include feeding and growth problems because of an immature digestive system, anemia, infections, and general failure to thrive.

For any infant, it is impossible to predict the likelihood of a significant handicap (moderate or severe mental retardation, inability to walk without assistance, blindness or deafness). However, some factors increase the risk for these handicaps: extreme prematurity, identifiable brain abnormalities, and lengthy periods of illness. It is necessary to understand the limitations of trying to use information available during infancy and early childhood to predict later development. Some aspects of development are affected by experience; other aspects of development will unfold at the rate they would have if the child had been born at term.

Continued Childhood Disabilities

Children who are born prematurely have an increased risk for early brain injury that is often associated

with developmental difficulties. Motor symptoms are usually the earliest manifestation of early neurological injury. These symptoms may resolve as the child recovers, or they may eventually be diagnosed as cerebral palsy. Although early identification is necessary for early intervention, it can be very difficult to establish clear diagnoses of neurodevelopmental problems in developing infants.

During childhood, health difficulties can continue in the form of frequent illnesses. Minor disabilities during school age may result, which include short attention span; specific learning problems in school, such as difficulty with math or reading; language delays; low intelligence test scores; deficits in motor coordination and school learning; and poor emotional adjustment. Generally, children with these relatively minor disabilities lead normal lives.

SOCIAL COMPONENTS: FAMILY ISSUES

During this stressful time of infant diagnosis, parents may unknowingly worsen the situation. Separate from the physical elements are the social elements of high risk. From the very beginning, there are many reasons to be concerned about the high-risk infant's early social environment. In most physical high-risk situations, parents are unable to be with their babies in the same way, particularly if life-supporting technology is involved. Hospital isolettes provide the baby support, but the necessary physical separation can interfere with parent-infant bonding. Hospital procedures can delay opportunities to hold and interact with the baby in semiprivate settings.

Parents may have their own personal concerns around past experiences that can affect bonding with the high-risk baby. Even the baby's characteristics can affect bonding, such as the baby's health, physical defects, alertness, and responsiveness. Each of these has potential to interfere with eye contact or with facial expression, which are key to developing a bond between infant and parent.

Concerns about parental competence certainly overwhelm parents. These areas include providing physical care, physical protection, and psychological support; controlling, motivating, and regulating children's behavior; and teaching and providing knowledge and skills in a loving environment. These, in addition to the stress of having a high-risk infant, along with financial concerns, can add to these overwhelming feelings.

Psychosocial Concerns for Families

In addition to bonding and social stressors, there may be psychosocial issues on the part of family members that can affect the high-risk infant. First, high-risk pregnancies and low birth weight are most common among low-income women, especially women of color. These mothers are more likely to be undernourished and live in conditions that expose them to harmful environmental influences such as pollution, unsafe housing, and chemical exposures. Further, they may have less access and experience more barriers that keep them from receiving the prenatal care necessary to protect them and their babies. Maternal psychological status during pregnancy can also be a risk concern, which may include unwanted pregnancy, lack of support, and psychiatric disorders. These psychological issues may manifest themselves in drug or alcohol use, mental illness, or depression. Other psychosocial concerns, including parental issues about attachment and loss, adolescent-aged parents, and extreme situations involving violence, can affect the social environment of an infant, whether high risk or not.

Second, a difficult infant may be so frustrating to the caregivers that they spend less time interacting with him or her. The infant's poor social competence may also put him or her at risk, particularly if the infant is incapable of expressing needs to adults. Risks are greater when the infant shows low readability, low predictability, and low responsiveness to adults.

Finally, experiences that occur by chance may also affect the family or infant alone. Sudden and too-frequent changes from familiar to unfamiliar situations can be stressful for the infant. Other extreme experiences, such as the death of a parent or separation after attachment has taken place, can negatively affect the infant. Risk is more evident when the separation is abrupt and prolonged, and can be seen in the infant in the forms of protest, despair, and then detachment.

Psychosocial Coping With Stress

Caring for a premature infant can be a great challenge, which can naturally bring on anxiety about the baby's health and feelings of anger, guilt, or depression. Postpartum depression and physical recovery from birth, in addition to caregiving stresses, can lead

to overwhelming fatigue. Some suggestions for parents may help during this difficult time:

- Learn everything you can about your baby's condition. In addition to talking to your doctor and your baby's caregivers, read books on premature birth and look for information on the Internet.
- Take care of yourself, providing yourself with rest and good nutrition to feel stronger and better able to care for your baby.
- Seek good listeners for support, including partners, friends, family members, or premature baby support groups.
- Accept help from friends and family to help save your energy for your baby.
- Keep a journal. Record the details of your baby's progress as well as your own thoughts and feelings. Include pictures of your baby, so that you can see how much he or she is changing.

STRATEGIES TO DECREASE RISK: INTERVENTIONS

Most high-risk premature infants eventually develop beyond any negative consequences associated with prematurity. Close attention to developmental needs can help lessen any long-term impact of the temporary developmental problems many premature infants experience. For children who develop long-term conditions as a result of early medical complications, immediate interventions can reduce the eventual level of *disability*.

Perinatal Services

Perinatal services must be provided as quickly as possible to minimize disability by identifying possible conditions requiring further evaluations, diagnosis, and treatment. Early intervention programs often take place in the neonatal nursery, at home, and at special centers. In addition to early screening assessments (reviewed earlier), special attention may be given to the handling of the newborn. A form of holding encouraged in many NICUs is known as *kangaroo care*, the skin-to-skin contact between infant and caregiver. This form of holding was adopted from countries where isolettes to keep preterm infants warm are scarce. Studies show that the mother's body temperature adjusts to keep the baby's temperature at the right level. The baby's breathing also becomes more even, and heart rate and blood oxygen levels stay steady. Also, giving the stable infant gentle massage for short periods daily has been shown to help babies gain weight faster.

Perinatal services also may provide parents training in infant caregiving skills: when effective stimulation helps preterm babies develop, parents are likely to feel encouraged and interact with the baby more effectively. For example, home visit programs include multiple visits, during which physical exams and developmental screenings are administered by nurses. Evaluations of homes for infant safety, providing health and parent education, and reinforcing hospital discharge treatment instructions are also part of these programs. Nurses also provide referrals to other public health and community social services that can assist the family. At each visit, the infant's physical, developmental, psychosocial, cognitive, and emotional growth is assessed so that any need for further services can be identified quickly. Studies have found that those receiving home visits had fewer life-threatening illnesses, fewer hospital admissions, fewer intensive care admissions, and fewer days in the intensive care unit than those not receiving the program.

Developmental Care for the Newborn

Another widely used strategy for working with high-risk newborns is developmental care. Developmental care is designed to prevent the brain from being injured by intense or painful stimulation, and to provide the kinds of everyday experiences that will help the baby to develop normally. A major goal of developmental care is to protect the high-risk infant's brain and central nervous system, which control the five areas of development (physiological, motor, sleep/wakefulness, attention, and self-regulation) that are the base for the baby's motor, mental, and social development.

Studies of developmental care have shown that by making the NICU world more "baby friendly," some of these problems can be prevented. The physical environment can be changed to reduce the amount of sound and light, provide some support for the baby's position because he or she cannot get into a comfortable position alone, make treatments less stressful and frequent, and provide gentle handling by pacing the care according to how the baby reacts.

Through the developmental care approach, parents are taught to become attentive to the many ways an infant interacts with those around him or her: by looking,

listening, and touching and feeling. When the baby attends, he or she focuses on and follows things and makes eye contact. This approach can easily be incorporated into discharge planning from the NICU. Important aspects include the parents' involvement in their infant's care, plans for special needs such as oxygen and apnea monitoring, and teaching the parents special skills such as cardiopulmonary resuscitation.

With the realization that the parents are undergoing transitional stress that may interfere with their ability to learn, parental education is often reinforced after the infant's discharge. This educational programming includes developing parenting skills, helping parents build close affectionate ties to their infants so that they will be attuned to their babies' special needs, and encouraging the family to work together, particularly during crises and decision making.

Continued Care for Toddlers

As the high-risk infants develop into toddlers, specific skill areas such as vision, speech, and hearing will continue to be examined as well as overall developmental performance. During this developmental period, preschoolers develop, modify, and master skills in the areas of motor performance, cognitive development, social awareness, and language functioning. Toddler intervention programs have the following general characteristics: (1) orientation to prevention of developmental delay; (2) orientation to changes in the infant's behavior, development, or relations with caregivers; and (3) focus on change within the family system to foster positive changes in the child.

Prenatal Prevention

Perhaps the best treatment for preterm and low-birth-weight infants is before the actual birth. Prevention in the form of focused self-care, regularly scheduled prenatal care visits, proper nutrition, avoiding any exposure to tobacco smoke, avoiding alcohol and illegal substances, and control of chronic medical problems are all ways that women can help maintain a healthy pregnancy to the full term.

In summary, high-risk infants face many developmental challenges that are caused by multiple factors. Given the high numbers of high-risk infants in the United States, many public health strategies have focused on prevention and early intervention with hopes of encouraging and funding multidisciplinary approaches to risk reduction during pregnancy and education of the general population about modifiable risk factors for and consequences of low birth weight.

—AnnJanette Alejano-Steele

See also Birth Weight, Low Birth Weight (LBW), Very Low Birth Weight (VLBW)

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HIGHER EDUCATION

At the beginning of the 21st century, colleges and universities in the United States are among the most visible and highly regarded in the world—providing individuals from all walks of life the opportunity to pursue higher education. From the founding of Harvard College in 1636 to the present, the twin pillars of change and innovation have shaped and continue to inform the character, quality, diversity, and access to higher learning offered in this nation.

CHANGE AND INNOVATION IN THE LATE 18TH AND 19TH CENTURIES

Establishment of New Institutions

Public Institutions

The first institutions of higher learning in the United States—anchored in the classical liberal arts curriculum offered solely at the undergraduate level—served the elite and were founded as secular institutions that prepared men for leadership in the American colonies as well as for careers in the ministry. This changed, however, in the late 18th and early 19th centuries as many states began establishing state institutions and, in 1819, the U.S. Supreme Court in the famous Dartmouth

College case drew a distinction between public and private institutions. As society became less agrarian and more industrial, public pressure grew on universities to meet the utilitarian needs of the expanding society throughout the 19th century. The new state universities gradually became increasingly responsive to society, especially through establishing so-called modern fields of study and conducting research that contributed to the "public good." They were aided in these efforts by the passage of the Morrill Federal Land Grant Act of 1862, which provided grants to each state for support of at least one college to teach subjects related to agriculture and engineering.

Women's Colleges

As state universities were flourishing during the second half of the 1800s, certain groups were being denied their benefits. Women were one such group. Although Oberlin College, a liberal arts school in Ohio, first admitted women in 1837, most eastern colleges refused to admit them. Thus began the women's college movement, with the founding of Vassar (1865), Wellesley (1875), and a host of other all-female schools. Women in these schools were taught subjects—such as grammar, geography, and household arts—aimed at preparing them to be housewives, mothers, and school teachers, and their proponents argued that these schools met the demand for higher education without sacrificing a woman's femininity. There were 119 women's colleges by 1900.

Historically Black Colleges and Universities

In the years following the Civil War, most institutions closed their doors to blacks, just as they did to women. New educational opportunities were created, however, with the passage of the Second Morrill Federal Land Grant Act of 1890. This law specifically prohibited payments of federal funds to states that discriminated against blacks in admission to their tax-supported colleges; states using federal funds had to either make their schools open to both blacks and whites or make money available for segregated black colleges to serve as an alternative to white schools. This led Southern states to establish dual systems of higher education, and to the founding of 17 land-grant colleges that had the principle mission of educating black Americans. These schools came to be referred to as *historically black colleges and universities* (HBCUs), and today there are 103 of them in the United States.

Change and Innovation Within Institutions

Faculty

The mid-19th century saw not only a transformation in the types of institutions that were educating our citizens, but also a change in who was teaching them in the classroom. Especially beginning during the late 1870s, faculty began to be trained in specific disciplines and took on new careers as full-time instructors; they were no longer preparing for the ministry or for leadership. By the late 1870s, only 15% of faculty engaged in clerical activities, whereas more than half were engaged in their fields of specialization.

Vertical Expansion: Growth of Graduate Education

Just as faculty were becoming specialists in selected fields, students began to further their education by obtaining master's and doctoral degrees. The University of Michigan awarded the first master's degree in 1851, Yale awarded the first PhD in 1861, and graduate education began to grow rapidly after the Civil War. Especially during the latter part of the 19th century, many colleges would become "universities"; many state colleges were transformed into universities, and some liberal arts colleges were reorganized into universities—institutions that offered advanced study leading to master's or doctoral degrees.

Horizontal Expansion in the Curriculum

As more institutions served an increasing number—and diversity—of students in the mid-1800s, new fields of study developed beyond the traditional fields. Modern subjects like mathematics, sciences (physics and chemistry), and fine arts were introduced, as was the elective system; students could now choose almost all of their courses and specialize in their choice of fields of study. The study of the liberal arts and sciences and professional fields was encouraged as the universities increasingly committed to advanced study and the advancement of knowledge through research.

CHANGE AND INNOVATION IN THE 20TH CENTURY

Establishment of New Institutions

Two-Year Colleges

Although the 19th century had seen a growth in state institutions and women's colleges, before the 20th century, no more than 4% of the college-aged population attended college. This did not mean that there was not a need for mass higher learning. The beginning of the 20th century saw a dramatic increase in the need for trained workers, growing public concern about advancing equality of opportunity, and concern about the inaccessibility of many 4-year colleges. These factors, combined with the desire of small and medium-sized cities without major institutions to bring mass higher education to their areas, led to the proliferation of 2-year, or "junior," colleges. Students needed training, but many were unable to attend state universities or private colleges, and 2-year colleges gave them another option when it came to access to higher education. By 1948, there were 650 junior colleges, and today there are more than 1,200. These schools focused on offering their students a collegiate education and "academic transfer" programs for the first half of the century, but since the 1950s, they have increasingly emphasized programs such as vocational and career education, continuing education, and remedial education.

On-Line Colleges

Today, the most accessible means of mass higher learning is on-line, or "virtual," higher education. On-line courses are often composed of students from all over the country—or the world—communicating via e-mail or video conference without ever setting foot on a physical college campus. Students in a mathematics class can, for example, simply dial in from a computer, watch a video of the lecture, and do their homework on-line. Initially, on-line education was often viewed as a preferred mode for meeting the needs of nontraditional, adult learners who needed to update their technological knowledge quickly, or who simply wanted intellectual enrichment. Increasingly, however, colleges and universities are incorporating on-line programs in their distance education and "traditional" programs, thereby allowing many more students access to higher education.

The University of Phoenix is the most well-known and oldest of the on-line institutions. It was founded in 1978 to provide educational programs for working adults and enrolled about 40,000 at that time. It has granted more than 370,000 degrees, most of which are in the fields of business and education.

Change and Innovation Within Institutions

Whereas 2-year colleges increasingly emphasized vocational and career education after World War II, a growing interest in the professions led most universities to offer a much greater range of undergraduate professional programs, from the arts to journalism to pharmacy and communications. And although most professional study took place at the undergraduate level through the first half of the 20th century, many universities began establishing graduate professional programs in such fields as architecture, business, and education. In addition, university presses and scholarly journals were founded to provide outlets for the results of investigations, and professional associations were created to disseminate research and scholarship in the various fields of study.

Contemporary Portrait: Diversity in Higher Learning

According to the *Almanac of the Chronicle of Higher Education*, more than 15 million students are enrolled in America's institutions of higher learning. In 2001, more than 1,200,000 undergraduate degrees were conferred, 57% of which went to women. At the beginning of the 20th century, there were almost 591,000 full-time faculty members spread across 4,197 institutions of higher learning. Women account for about 56% of college students, and about 28% of all students are minorities.

As these statistics show, institutions of higher education in the United States are thriving. Two-year colleges have become increasingly important in recent years as an increased need for vocational training, for both adults and traditional students, has resurfaced in the marketplace. On-line and distance education continue to grow at a very fast pace: in 2001, more than 127,000 distance education courses were offered at more than 2,320 institutions—with traditional institutions adapting their programs to match what schools such as the University of Phoenix already provide its

students, not least for fear that they will lose potential students to programs that are more convenient and accessible. Finally, today's university has become a multipurpose "multiversity" that serves diverse purposes and peoples and has a close connection to society. There are more than 460 such diverse "universities," virtually all of which offer their students a wide variety of programs of study and activities.

CONCLUSION

Anchored in the legacy of change and innovation, our system of higher education has greatly enhanced the quality of opportunity for many diverse students while concurrently advancing both high-quality curriculum and diversity through higher education. At the same time, there continue to be many external and internal pressures as higher education moves further into the 21st century. Among them is a growing public consensus that the private benefits of higher education are greater than the public benefits, and, in turn, many states and institutions are witnessing significant losses of public funding. Among many others, the challenge of maintaining quality and a commitment to equality of opportunity will clearly advance change and innovation across the higher learning environment. As it has in the past, higher education will need to build on its legacy and embrace change and innovation throughout the 21st century.

—Kristina Gislason and Clifton Conrad

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HISPANIC AMERICANS

Americans of Hispanic descent include people of any Mexican, Central and South American, and Caribbean nationality. Hispanics in the United States are a diverse population with great within-group and between-group differences. Many are relatively acculturated to mainstream American values, whereas others are more oriented toward their own traditional culture. Most (60%) of Hispanics in the United States were born in the United States, speak English, and aspire to achieve many of the same goals as others in the United States, such as earning a decent wage, providing a comfortable home to their children, and having their children excel educationally. In general, Hispanic Americans have a strong work ethic, are passionate about life, and are highly committed to their families and children. Their ethnic culture is rich in both tradition and customs, and their growing presence in the United States is reflected by their increasing influence in popular culture and in contemporary political discourse.

The term *Hispanic* stems from the word *Hispania,* which originally referred to the Iberian Peninsula that is now Spain. The U.S. government first used the term for the 1980 census count in reference to individuals with Latin American ancestry residing within the United States. Individuals of Spanish descent in the United States also may be included under the term. The ethnic label, *Hispanic,* however, is not universally accepted by all, and individuals rarely refer to themselves in that manner in their countries of origin. Different groups, and even individuals within the groups, have varying opinions regarding their preferred term for self-identification. Some individuals, particularly in the West, prefer "Latino/a" and view Latino/a as a more progressive ethnic label. Yet, Latino/a is opposed by some because they believe the term reflects the Roman empire that had conquered Spain, or because the term Latin generally refers to various southwestern European countries. Moreover, both terms (Hispanic and Latino/a) are polemic because neither term conveys the heterogeneity among people of Latin America. Nevertheless,

ethnic nomenclature is arbitrary and constantly changes across time and geography.

During the past 20 years, the Hispanic American population has grown tremendously in the United States. The U.S. Census of 2002 reported that there were 37.4 million Hispanics living in the United States, in comparison with 22.4 million in 1990, and 17 million in 1985. In fact, Hispanics have surpassed African Americans in number and are now the second largest ethnic group in the United States. As of 2002, about 66.9% of Hispanics living in the United States were of Mexican heritage, 8.6% of Puerto Rican decent, and 3.7% Cuban; the remaining 20.8% were mostly from various countries in Latin America. Some areas in the United States, such as Central Florida, for example, recently have experienced a large influx of South Americans, which is altering the Hispanic landscape of Florida. Not reflected in the national figures are the illegal or undocumented migrants who were not adequately counted. Although accurate figures are hard to obtain, it is estimated that about 7 million illegal Mexican immigrants currently live in the United States. Because of their illegal status, they often are taken advantage of and occupy low-paying jobs, working in agricultural settings, factories, and as domestic workers.

Collectively, the Hispanic American population is exceedingly young. The average age of Hispanics is close to 9 years younger than that of non-Hispanic whites. The median age, however, of the subpopulations of Hispanics ranges from 43.6 years (Cuban Americans) to 24.6 years (Mexican Americans). Hispanics' relatively strong religious background with an emphasis on large families also contributes to twice as many Hispanic households composed of four or more people (54%), compared with non-Hispanics (28%). About 40% of the Hispanic population was born outside the United States, and about 28% report speaking English "not well" or "not at all," suggesting that most Hispanics in this country do acculturate and master English in various degrees.

Metropolitan areas are home to the majority of Hispanic Americans, but they reside in every state, including Alaska and Hawaii. Additionally, several states have substantial percentages of their populations made up of Hispanics, such as New Mexico (42%), Texas (32%), California (32%), and Arizona (25%). Certain cities also have high percentages of Hispanic Americans, such as San Antonio (54.5%), Los Angeles (43.5%), Miami (34.1%), Houston (31.6%), New York City (19.9%), Denver (19.5%), and Chicago (17.3%). The largest Hispanic subgroup—Mexican Americans—primarily populate the southern (34%) and western (55%) regions of the country in addition to many metropolitan areas. Cuban Americans reside primarily in the south (75%), whereas large northeastern cities are the principal residences of Puerto Ricans (58%).

CHALLENGES FOR HISPANIC AMERICANS

The Hispanic population in the United States, along with their Latin American and Caribbean counterparts, has experienced a series of conquest, oppression, and struggle for freedom, which has led to pervasive social oppression. Spanish and Portuguese conquistadors destroyed much of the indigenous cultures and religions while subjugating, killing, and enslaving the people (it bears noting that intertribal warfare and slavery were common among indigenous Americans before the arrival of Europeans to the New World). The European immigrants quickly claimed ownership of territories in the New World, thereby holding the power and being able to oppress the indigenous people. Ironically, the ancestors of Hispanics have been, and continue to be, the oppressors as well as the oppressed. Because of the continued socioeconomic and political oppression in many Latin American countries, many people from all over Latin America hope for a better life in the United States.

Upon arrival in the United States, some Hispanics are disheartened to find that they still encounter societal oppression. Facing a society with a different set of values is difficult for many ethnic minority groups, including Hispanics. As an attempt to inoculate themselves from real or perceived discrimination, some Hispanics resist acculturating and strive to hold onto their language and cultural traditions. Most, however, acculturate in various degrees and gradually relinquish old ways in favor of mainstream culture. A modest amount of research suggests that having a bicultural orientation is most optimal for Hispanics because biculturalism seems to provide individuals with opportunities to selectively conserve preferred aspects of their native culture while incorporating practices and values of the host culture.

Although the various Hispanic groups may face similar challenges here in the United States, competition *among* Hispanic subgroups is not uncommon. This is believed, in part, to relate to the history of conflicts between and within their countries of origin. Intra-Hispanic

relationships, for example, are affected by racism and classism. Throughout Latin America, those with darker skin or having indigenous or African ancestry are considered to have lower social status than those with lighter skin. Also, Latin America is plagued by deeply entrenched notions of classism. Those of the lower social classes experience discrimination in practically all spheres within their respective communities. Many Hispanics transport their prejudices with them from their countries of origin and sometimes discriminate against each other in the United States, especially when they fear that individuals from other groups may obtain more of the scarce jobs and resources. To non-Hispanics, these prejudices often are inconspicuous because the groups may share communities together and appear outwardly to coexist amicably.

HISPANIC DIVERSITY AND SIMILARITIES

Even though there is great diversity among Hispanics as a function of their country of origin, cultural ancestry, and social class, there also are some similarities across many individuals belonging to this broad ethnic group. For example, the primary language of most people from Latin America is Spanish, although, even on this characteristic, there is wide variation. For example, the most common language spoken in South America is Portuguese because Brazil is the most populous country on that continent. The primary language of citizens of Belize, including among those of African ancestry living in Costa Rica, is English. Moreover, numerous dialects of both indigenous people and descendants of Africa are spoken throughout Mexico, Central America, and South America. Roman Catholicism is the most common religion. *Personalismo*, placing a high value on individuals' dignity and self-worth and preferring close, intimate friendships, is theorized to be another common value for many Hispanic people. The emphasis placed on family unity, connectedness, and loyalty arguably is the most common value among Hispanics. The family is valued above the individual, and cooperation generally is valued above competition among family members. Many Hispanics feel that they can always count on their families to provide them with various forms of support throughout their lives; they in turn feel responsible to reciprocate in this regard to their childhood, extended, and procreational family members.

Hispanic families vary and are in a state of flux because of a confluence of factors. The traditional Hispanic family commonly is hierarchical in nature, with the elderly, parents, and males having special authority. Children typically are socialized to be *bien educados,* which refers to behaving well and complying with adults' requests. After children reach adolescence, many are expected to contribute to the family finances, especially among those from the working classes. The parents, in turn, often assist their children financially, morally, and with child care of their grandchildren throughout their children's lives. Sex roles tend to be rigidly defined in some Hispanic families. Consistent with traditional Hispanic culture, men are expected to be strong, dominant, and the family provider, whereas women are expected to be nurturing, submissive, and self-sacrificing. The father is considered to be the head of the family.

Although some Hispanics may exhibit similar physical characteristics, they also may vary tremendously, resembling blacks, Native Americans, Asians, or Europeans as a result of the mixing of races that has taken place in their countries of origin. Mexican Americans are primarily of mixed (*mestizo*) indigenous and Spanish background (in Mexico, about 50% of the population is *mestizo*, 30% is indigenous, and 20% is of European heritage). Cuban Americans and Puerto Ricans often are of Spanish heritage, but also may be of African or mixed ancestry.

Although it might be assumed that the significant increase of Hispanics in the U.S. population would lead to an increase in political or economic power, this has not been the case thus far. Many Hispanics struggle economically and are disproportionately represented among the unemployed and underemployed. Many hold semiskilled, blue-collar jobs. It also is common for Hispanics to live in substandard housing. Although this situation may be related to discrimination, it also is due to Hispanics' relative lack of education or vocational skills. Generally, Hispanics do not fare well in the educational sphere. More than one third drop out of school before obtaining a high school diploma, which is about twice the rate of African American students and almost four times the rate of non-Hispanic whites. Some parents of Hispanic children have difficulty advocating their children's educational needs because of their own low education levels or lack of English proficiency. Surveys reveal that most Hispanic parents have high hopes for their children's educational attainment, but struggle knowing how to appropriately support their children's academic endeavors.

A CLOSER LOOK AT THREE HISPANIC SUBGROUPS

Mexican Americans

The Mexican-American war, which began in 1846 and resulted in the signing of the Treaty of Guadalupe Hidalgo in 1848, resulted in Mexico's forfeiture of lands now constituting Texas, California, New Mexico, and parts of Colorado, Arizona, and Utah. The Mexicans inhabiting those areas were primarily *mestizos*—of mixed indigenous and Spanish ancestry. In essence, with the stroke of a pen, more than 100,000 Mexicans instantly became Mexican Americans.

Historically, Americans' attitudes toward Mexicans and Mexican Americans have been less than favorable or ambiguous at best. Many Mexican American landowners lost their lands to white Americans shortly after the Treaty of Guadalupe Hidalgo as a result of duplicitous U.S. legal maneuvers. Also, during various periods over the past 150 years, the United States has vacillated between encouraging Mexican migrants to the United States to satisfy cheap labor demands and discouraging them by conducting deportation sweeps and denying social benefits and educational opportunities for their children. Today, although completely irrelevant to some Mexican Americans, issues related to immigration still affect many Mexican Americans given that they or extended family members must contend with immigration issues at some point in their lives. Further, because Mexican Americans generally have darker skin than whites, they have endured ongoing social discrimination in various degrees.

Contemporary Mexican Americans are quite diverse. Descriptors commonly applied to Mexican Americans have included loyal, hardworking, humble, family oriented, and Catholic. Although some values and traditions are shared across vast segments of the Mexican American population, Mexican Americans vary in personalities, acculturation, socioeconomic status, educational attainment, and occupation. Mexican Americans also vary in their preferred ethnic label, often as a function of interactions between sociodemographic variables, language proficiency, and experiences with discrimination and oppression. Some self-identify as Mexican, Spanish, Mexican American, Americans of Mexican descent, Latin, Chicano, Hispanic, and Latino. Also, intermarriage increasingly is leaving its imprints on Mexican American identity, attitudes, and behaviors. Marriages in which one partner is Mexican American and the other is non-Hispanic white represent the most common interethnic marriage in the United States.

For some Mexican Americans, the pressure to adapt or acculturate toward mainstream customs and values is stressful as they struggle to negotiate a myriad of personal, family, and cultural changes. In contrast, some Mexican Americans comfortably gravitate toward behaviors and attitudes consistent with non-Hispanic white American culture. Still, other Mexican Americans selectively acculturate, electing to maintain specific Mexican beliefs and values while adopting specific mainstream ideas or customs. Despite the inevitability of acculturation, the unity and cohesion of Mexican American families sometimes can be compromised as family members—particularly during the first few generations—learn to balance their adherence to traditional family values with their adoption of egalitarian and individualistic values of mainstream American culture.

Mexican Americans' loyalty to their families is a prominent cultural characteristic. Mexican Americans' concept of "family" extends beyond the nuclear family and includes uncles and aunts, cousins, and grandparents. An acceptable situation among many Mexican Americans is living with their parents until they marry. Even then, it is not uncommon for newlyweds to live with either the bride's or groom's parents indefinitely following the wedding. Among most Mexican Americans, no social stigma is attached to adults who live in their parents' homes. Another custom among many Mexican American families is socializing children to value their relationships with siblings over friendships. The end result is that Mexican Americans often maintain very close, lifelong ties to their siblings. Close sibling ties into adulthood perpetuate the family bonds because their own children will have extensive contact with uncles, aunts, and cousins. Also, many Mexican Americans abhor the practice of placing aging or sick parents into elderly institutions. Aging parents expect to live with one or more of their children up until their death.

Mexican culture has historically provided well-defined hierarchal roles for husbands and wives whereby males enjoyed power, privilege, and status. However, changes over the past several decades have modified those perceptions and expected behaviors. Contemporary Mexican American women generally have more freedom to pursue their own occupational or professional interests. Moreover, various social, acculturative, and political changes have created a

wide range of lifestyles that have characterized family life for Mexican Americans anywhere from patriarchal to egalitarian, and every style in between.

Puerto Ricans

In 1898, following the Spanish-American war, Puerto Rico became a territory of the United States. Since 1917, when U.S. citizenship was granted to all Puerto Ricans, they have been migrating to the United States in search of improved economic opportunities. During the first half of the 20th century, Puerto Ricans settled primarily in New York City and performed mostly manual labor in various industrial and agricultural types of employment. The largest Puerto Rican migration occurred between 1946 and 1965, when an average of 34,000 Puerto Ricans per year relocated mostly to New York City, but also to some areas of New Jersey, Connecticut, and Chicago. As economic conditions improved dramatically on the island of Puerto Rico during the 1970s, the number of Puerto Ricans immigrating to the United States declined considerably and even influenced many U.S. Puerto Ricans to return to the island. Nonetheless, today, almost as many Puerto Ricans live in the United States (3,406,178) as on the island (3,623,392). The Puerto Rican migration has been described as a "revolving door" because since 1965, many Puerto Ricans have moved to and from the United States, sometimes multiple times.

Puerto Ricans' experiences in the United States are similar to other immigrant groups because they have different sociocultural traditions and speak a language other than English. Even after several generations in the United States, Puerto Ricans tend to maintain a strong ethnic identity and retain the ability to speak Spanish. Puerto Ricans living on the island have most of the rights and obligations of U.S. citizens, such as paying social security taxes, receiving some federal welfare, electing to serve in the U.S. military, and holding U.S. passports. Only Puerto Ricans living in the United States must pay federal taxes and have the right to vote in the presidential elections.

Puerto Ricans, both in the United States and on the island, often call themselves *Boricuas* and refer to the island as *Borinquen* in verses, songs, and conversation. Puerto Ricans, as a group, are ethnically and racially mixed. They are the descendants of Taino (the original indigenous people on the island when it was discovered by Spaniards), Spanish settlers, and African slaves (Puerto Rico actively participated in the slave trade until 1870). Taino and African cultural beliefs and traditions blended with the dominant Spaniard culture to give rise to Puerto Rican musical, literary, and cultural tradition and to their contemporary national identity. Puerto Ricans have a fluid concept of race that considers shade of skin color, facial features, and hair texture in determining a person's race. Racial categories in Puerto Rico include black and white as the two ends of the continuum, with other categories in between that describe specific combinations of features such as *trigueño* (light brown skin), *moreno* (dark brown skin), *indio* or *canela* (light brown skin with Caucasian features), or *jabao* (light skin color with Negroid facial features or hair texture).

In the United States, Puerto Ricans are one of the most economically disadvantaged ethnic groups. They have a lower rate of labor force participation, a higher rate of unemployment, and a higher poverty rate than non-Hispanic whites as well as other Hispanic groups. According to the Census Bureau in 1999, the unemployment rate among Puerto Ricans in the mainland aged 16 or older was 8.1%, compared with 3.4% for whites, 7% for Mexicans, and 5.8% for Cubans. Moreover, close to 26% of Puerto Ricans lived below the poverty level, compared with less than 8% of whites, 24% of Mexicans, and 17% for Cubans. In addition to social discrimination, it is believed that their relative lack of educational attainment and difficulty with the English language significantly contribute to their economic problems. They also have been affected disproportionately by the industrial restructuring of the northeast United States in the past decade.

Many Puerto Ricans long to return to their island, where they think they will feel "at home." However, once back on the island, they often experience language and adjustment difficulties, including occasional rejection by island Puerto Ricans. From the perspective of those on the island, U.S. Puerto Ricans have excessively liberal gender attitudes, inadequate fluency in Spanish, low achievement levels, and somewhat of an aggressive demeanor. On the island, Puerto Ricans born or raised in the United States are referred to as *Nuyoricans*, a term referring to Puerto Ricans from New York. That label implies a separate identity from island Puerto Ricans.

Puerto Ricans generally place a high value on maintaining harmonious and interdependent relations with family and friends and place less emphasis on individual autonomy. Puerto Rican culture is relatively

sociocentric. The needs and interests of the group (usually the family) take precedence over individuals' needs. There is a tendency to avoid dealing with conflict directly. For example, they prefer to say a "white" lie rather than openly refuse information to someone. They also expect their children to be respectful, quiet, and obedient. Regarding religion, Puerto Ricans are overwhelmingly Catholic, although Puerto Rican men tend to be Catholic "in name only." Elements of Taino mysticism, African Santería, and European spiritism have infiltrated Puerto Rican Catholicism. Evidence of their influence is apparent by some Puerto Ricans' willingness to consult with traditional folk healers for social support or assistance with emotional or family problems.

Cuban Americans

Among Hispanics in the United States, Cuban Americans make up roughly 3.7%, with 65% of them residing in Florida alone. There also are significant Cuban American populations in New Jersey, New York, and California. The mean age for Cuban Americans is 40.7 years (for comparison, the mean ages for other U.S. Hispanics and for the entire U.S. population are 25.9 and 35.3 years, respectively). Moreover, in comparison to other Hispanic groups in the United States, Cuban Americans have the highest education and income levels, the lowest birthrates, the highest percentage of married households with both spouses present, and ironically, the highest rate of divorce.

People from Cuba have been immigrating to the United States since the 19th century, and Cuban influence in the history of the United States often is overlooked. The U.S. government has a history of intervening in Cuban affairs dating back to the Spanish-American war. When Fidel Castro assumed control of Cuba in 1959, his government implemented drastic social, economic, and political changes to the country, consequently instigating the first significant wave of Cuban immigrants to the United States. This first wave of immigrants was primarily upper-class and upper-middle-class professionals whose ethnic background was mostly Spanish (white Europeans). They generally were welcomed to the United States, and many benefited from federal resettlement programs. Shortly thereafter, this cohort of Cuban Americans came to be viewed as "model minorities" in terms of their ability to integrate into U.S. society and establish themselves as a viable economic and political social group.

Subsequent waves of Cuban immigrants increasingly resembled the Cuban population as a whole in terms of race and socioeconomic class. In the early 1980s, the *Marielito* wave of Cuban immigrants was largely unemployed and had a larger percentage of Afro-Cubans. Many of these immigrants were interned upon entry to the United States and were frequently stereotyped as criminal, homosexual, or socioeconomic outcasts of Cuba. Their plight in the United States was further complicated by the social rejection they encountered by many Cuban Americans who, having come to the United States during the first wave, had already established themselves in their respective communities. Cuban immigration once again peaked after the collapse of the Soviet Union with the *balsero* (rafters) wave of immigration in 1994. Although there has not been a subsequent wave of immigrants, some Cubans still attempt to navigate the treacherous waters between Cuba and Florida with the hopes of reaching the United States. Cubans—unlike any other national group—are the recipients of a favorable U.S. immigration policy that grants permanent residency to any Cuban who physically reaches U.S. soil.

Despite the fact that compared with other minority groups, Cuban Americans generally have excelled along various economic and political indexes, many continue to contend with an array of problems associated with their status as ethnic minorities, including racial discrimination. For example, they still lag behind non-Hispanic whites in terms of annual income and educational attainment. Also, Cuban American professionals may encounter a "glass ceiling" restricting their promotion and upward mobility. A common problem among Cuban American families is related to differential rates of acculturation, causing intergenerational conflict. More specifically, younger family members typically adopt mainstream U.S. social values more quickly than their parents and grandparents. This form of strife between parents and children is a common presenting problem at counseling centers where some Cuban American families seek professional assistance for intrafamilial distress.

Moreover, for many Cuban American elderly people, life in the United States has been a mixed blessing. Many of the first wave of Cuban immigrants had believed they were coming to the United States on a temporary basis while they awaited the demise of

the Castro government. Many members of that generation have died or are quite elderly and have witnessed, to their own surprise, the tenacity of the Castro government despite a U.S. military invasion, the collapse of the Soviet Union, and an ongoing economic embargo. Consequently, despite relative success in the United States, many elderly Cuban Americans have considerable anger and resentment over the lives and property they have lost in Cuba. Although they may have pride in the success of their children and grandchildren, they also may resent younger generations' inability to sustain, or lack of interest in sustaining, traditional Cuban culture.

CURRENT TRENDS

Because of relatively high birthrates and legal and illegal immigration, Hispanics are the fastest growing ethnic group in the United States. Projections indicate that the percentage of Hispanics in the United States will be comparable to that of non-Hispanic whites or possibly larger within the next 30 to 50 years. Because of the United States' close proximity to Mexico, Hispanics of Mexican ancestry likely will continue forming the largest Hispanic subgroup in the United States. However, the national origins of U.S. Hispanics will continue diversifying given the new and steady flow of South Americans immigrating to this country. Whether Hispanic Americans collectively attain more economic and political power remains to be seen and will depend in large part on the degree to which they attain higher levels of education. Nonetheless, their presence and influence are already felt in areas such as music and art, foods, political discourse, and scholarship, and they will continue to have a significant impact on contemporary U.S. culture.

—Charles Negy

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HOLOCAUST

Holocaust is the term used to refer to the attempted annihilation of European Jewry and the brutal persecution of an extended "mosaic of victims" by German Nazis.

WHEN DID THE HOLOCAUST OCCUR AND HOW DID IT UNFOLD?

The persecution of Jews began soon after Adolph Hitler was appointed Chancellor of Germany on January 30, 1933. Between that date and November 9, 1938 (the date of *Kristallnacht* or "night of broken glass" during which there were state-sanctioned assaults on Jewish persons and property throughout Germany), the rights of Jews were continuously defrayed. Social, political, and psychological separation from German society was succeeded by physical attacks and incarceration in German concentration camps. During these years, many Jews tried to emigrate from Germany, but most countries of the world refused to accept them.

By the outbreak of World War II, Nazi rule extended to Austria and Czechoslovakia, and by 1941, most of Europe fell under Nazi domination, including the millions of Jews who resided in these countries. At this point, Jewish emigration to nonoccupied areas of the world—which was difficult before—became virtually impossible. Fueled by an "ideology of death," Nazi leadership began to generate a series of "solutions to the Jewish problem" (the excess number of Jews living in areas that the Nazis wished to clear for repopulation by their own citizens). An early plan was to deport and concentrate all Jews on the French island of Madagascar, off the coast of southwest Africa. However, this plan became technically impossible once the

Germans lost the Battle of Britain. The Nazis next confined Jews in ghettos and forced labor and concentration camps. In 1941, as Germany prepared to invade the Soviet Union, Nazi policies toward the Jews changed once again. It became clear that efforts to rid Nazi-occupied lands of Jews required more extreme measures. Thus "the final solution to the Jewish question" was set in motion: complete and total annihilation of the Jewish people, whereby every Jewish man, woman, and child was to be killed. Several strategies were implemented to achieve this end: massacres were perpetrated by killing squads (the *Einsatzgruppen*); and systematic murder by asphyxiation was conducted first in mobile gas vans and then in stationary "death factories," the extermination camps.

By the end of World War II, approximately 6 million Jews (one third of the Jewish population in Europe before the war) had perished. An additional 5 million people, representing different victim groups, also succumbed to the Nazi onslaught: "victims by birth" (Gypsies, the mentally and physically handicapped), "victims by belief" (Jehovah's Witnesses, Catholic priests), and "victims by behavior" (Communists, political dissidents, homosexuals). However, the Jews were the main focus of the German "ideology of death." For this reason, the Hebrew word *Shoah* (whirlwind) is often used to distinguish the Jewish experience from the experience of other victim groups.

HOLOCAUST VERSUS GENOCIDE AND ETHNIC CLEANSING

The word *genocide* had not yet been invented when the Holocaust began. Indeed, it was coined in 1944 by Raphael Lemkin, a Polish Jew who managed to find refuge in the United States in 1941. Derived from the Greek word *geno* (race or tribe) and the Latin word *cide* from *caedere* (killing), Lemkin defined genocide as "a coordinated plan of different actions aiming at the destruction of essential foundations of the life of national groups, with the aim of annihilating the groups themselves." He further identified two patterns of genocide: (1) destruction of the oppressed group, and (2) imposition of "the national pattern of the oppressor" onto the oppressed population. Implied in this second pattern is that members of the oppressed group might be allowed to remain, but their leadership, language, culture, and religion would all be subsumed into the "colonizing culture." The distinction between these two patterns of genocide makes it possible to differentiate the Holocaust (exemplar of Lemkin's first definition) from other incidents of genocide. Indeed, for many, the word Holocaust itself has evolved into the generic name for an ideologically motivated, planned total murder of a whole people.

Ethnic cleansing, in contrast, was defined by the United Nations in 1993 as "rendering an area wholly homogeneous by using force or intimidation to remove persons of given groups" manifested "by means of murder, torture, arbitrary arrest and detention, extrajudicial military attacks or threats of attacks on civilians and civilian areas, and wanton destruction of property." Thus, while ethnic cleansing can occur through murder, it is not necessarily the total murder of a whole people.

PSYCHOLOGICAL EFFECTS OF THE HOLOCAUST

The Holocaust experience was one of extreme stress: there were pervasive hostile forces; death was imminent. In addition, the concentration camps and ghettos were closed systems where inmates could exercise only limited control over their environment, were frequently separated from their loved ones, and were often forced to violate their belief systems in the process of surviving or to helplessly watch while others were murdered. Understandably, after the war, many survivors manifested a variety of seemingly "abnormal" behavioral and psychological symptoms. Collectively, these symptoms have come to be identified as the "survivor syndrome": chronic anxiety, fear of renewed persecution, depression, recurring nightmares, psychosomatic disorders, social withdrawal, fatigue, hypochondria, distractibility, irritability, a hostile attitude toward the world, and—in the extreme—hallucinations and depersonalization. Identification of this syndrome was based on work with those survivors who sought psychiatric assistance and was initially generalized to all survivors, despite the fact that most Holocaust survivors never sought professional psychiatric or psychological help. This early "skewed picture" of survivors then most likely was an artifact of the fact that in order to receive reparations from the West German government, survivors had to "prove" that they were sufficiently psychologically disabled to warrant assistance *and* that these disabilities were a product of their treatment during the war. Thus, the most negative symptoms were emphasized within the early psychological literature.

An often highlighted symptom in this literature is "survivor guilt," or the expression of self-recrimination because one survived and others did not. This was identified primarily among those who were the sole

surviving member of their family, were unable to protect their children or other loved ones from harm (they survived but their children/parents/siblings did not), and felt that they were less worthy than those who had perished. This guilt often kept survivors "locked in the past," but it has also served as motivation to bear witness to the Holocaust and to keep alive the memory of those who perished.

More recent research has focused on the resiliency of Holocaust survivors—their ability to move on, to create new families, and to make significant contributions to society. The heterogeneity of the survivor community has also come to be emphasized. Not all survivors are alike. Their postwar adaptation may be seen as a function of their age at the time of the Holocaust, sex, country of origin (how long they lived under persecution), placement during the war (ghetto, forced labor camp, extermination camp, in hiding, engaged in active resistance), familial circumstances of survival (e.g., lone surviving member of their family or community), and pre-Holocaust family life and personality.

Another aspect of behavior that has received new focus is the kinds of resistance victims used to maintain their sense of self in a situation designed to render them "life unworthy of life." Circumstances delimited the degree of armed resistance that could occur, although there are some notable examples (e.g., the Warsaw ghetto uprising). More frequently used were spiritual resistance where Jews continued to observe holidays, say prayers, and maintain religious practices even in the most dire circumstances; artistic resistance, which has left a legacy of visual art pieces, musical compositions, and written poems, stories, and essays; interpersonal resistance, whereby victims helped each other survive in whatever ways they could; and psychological resistance, whereby victims refused to be reduced to subhumans. The use of "gallows humor" by adults enabled many to put themselves in a psychologically superior place; play served the same function for children.

Although the Holocaust ended 60 years ago, the effects of the Holocaust continue to live on within individual survivors as well as their children. Survivors continue to feel vulnerable and may communicate this sense of vulnerability to their children. Survivors and their children often experience role reversal, whereby the children take on the caretaking role. Conversely, and sometimes at the same time, parent survivors try to compensate for their inability to protect loved ones during the war by overprotecting their children. Again, the early literature on the second generation focused on the pathological aspects of the relationships with their survivor parents. More recent research, however, has shifted to explore the special strengths of children of survivors, most notably their capacity for empathy.

SUMMARY

The Holocaust was a unique event in human history, the thrust of which was to annihilate the Jewish people. About one third of the Jewish population of Europe did indeed perish. Of those who survived, many have incurred deep psychological scars. They also demonstrate the amazing resilience people are able to muster in the face of extreme traumatic experiences.

—Ann L. Saltzman

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HOME BIRTH

Giving birth at home is a tradition in many parts of the world because of limited access to health care facilities. In parts of Europe, the United Kingdom, Australia, and North America, women may choose to

give birth at home instead of in the hospital. The choice to give birth at home is undertaken for a variety of reasons: to enjoy the comfort of familiar surroundings; to have family and friends in attendance; to minimize separation from young children; to avoid contact with a "technological" environment; to have one-on-one care as opposed to care in a multidisciplinary, teaching environment; and to access the care that midwives qualified and experienced in attending healthy women are trained to provide. The term *home birth* implies that the birth is planned to take place at home. Unplanned home births are births that were intended to take place in hospital but happened at home or en route to the hospital because the labor was uncommonly fast, the mother couldn't get access to transportation, or the mother didn't know how far advanced she was in labor. Unplanned home births sometimes occur without professional attendants, and rates of adverse outcomes among unplanned home births versus planned home births are known to be higher. In North America, New Zealand, Australia, and some countries in Europe, for example, Switzerland, planned home births account for between 1% and 2% of births. In contrast, in the Netherlands, 30% of births are planned home births.

PLANNING FOR HOME BIRTH

Birth at home requires advanced preparation. There is a requirement to purchase needed supplies for a cost of about $20.00 (U.S.) and to have available adequate linen, a protective cover and pads for the bed, baby supplies, and maternity supplies for the mother. Access to a telephone and transportation must be assured on a 24-hour basis. The midwife should have formal arrangements in place to transfer care to a physician consultant if necessary, or to transport the mother or baby to hospital. Impending changes in weather and road conditions that could delay or eliminate the possibility of transport may influence the midwife or pregnant woman to initiate transport early in labor.

WHO PROVIDES CARE FOR HOME BIRTHS?

Birth at home is most often attended by midwives. Physicians are generally not covered by malpractice insurance to attend home births. Practicing midwives vary in their training and experience, and it is important to know the qualifications of the midwife under consideration for attending a home birth. Some countries (e.g., the United States (Washington State) and Canada) license direct-entry midwives. These midwives have completed an accredited course of training but are not necessarily nurses. In other countries (e.g., England and Australia), all midwives are nurses and are referred to as *registered* or *certified nurse-midwives*. In contrast, some midwives practice without formal training and are known as lay midwives. The practice of lay midwives is not monitored or regulated by a professional practice organization, unlike licensed or registered midwives. Families who wish to have a home birth may contact the professional practice association for midwives in their region or country and find out how to obtain the services of a credentialed midwife.

WHO IS ELIGIBLE TO HAVE A HOME BIRTH?

Consideration of a home birth requires an assessment of a woman's health status. Most professional organizations governing the practice of midwifery issue strict guidelines about who should plan birth at home. These usually include a singleton fetus (not twins or triplets), baby in the cephalic presentation (head coming first instead of the buttocks), full term (37–41 completed weeks of pregnancy), and no more than one previous caesarean section. Exclusion criteria include preexisting serious medical conditions, for example cardiac (heart) or renal (kidney) disease, insulin-dependent diabetes, or health problems arising in pregnancy such as preeclampsia (elevated blood pressure with protein in the urine), placental abruption (placenta is detaching from the uterine wall), placenta previa (placenta is covering the opening to the cervix), or active genital herpes.

SAFETY OF HOME BIRTH

A number of studies around the world have examined the safety of planned home birth among healthy women with a qualified midwife in attendance. These large studies from Canada, the United Kingdom, the United States, Switzerland, and New Zealand have not reported an increase in rates of adverse outcomes for mothers or babies compared with those among healthy women planning birth in hospital. In addition, planning birth at home is associated with reduced interventions during labor and delivery. About 15% of women initiating birth at home are transferred to the hospital at

some point during their labor. Even including these women, planned birth at home is associated with reduced rates of use of narcotic drugs and epidural anesthetics for pain relief, amniotomy (rupturing the membranous sac around the baby), and administration of drugs such as oxytocin and prostaglandins to accelerate labor. Women who initiate labor at home are more likely to have a vaginal than a caesarean delivery, electronic monitoring of the fetal heart rate, and episiotomy (an incision to widen the vaginal opening to hasten the birth of the baby). In addition to transfer during labor, a small percentage (1–2%) of mothers and babies require transport to hospital during the period immediately after birth. Whether reductions in interventions are attributable to the setting, home versus hospital, the practice of the attending midwife, or some aspect of the woman herself who has chosen home birth is not entirely clear because few studies have randomly assigned women to home or hospital birth. Certainly, women who chose birth at home are generally strongly motivated to have a natural or "physiological birth" because most midwifery professional organizations do not permit administration of drugs for pain relief in the home setting.

PAYMENT FOR HOME BIRTH

Midwifery care is paid for by the government in most countries with public health care systems. Private insurers cover home birth in some cases, but polices vary and should be examined in detail before making the decision to give birth at home.

WOMEN'S SATISFACTION WITH HOME BIRTH

Women who have completed birth at home, in comparison to women planning and completing birth in the hospital, report increased satisfaction with the birth experience, particularly in regard to having a feeling of control over the process of birth. Women giving birth at home are able to have whoever they want in attendance, to eat and drink nourishment of their choosing, and to engage in a variety of methods of pain management, including sitting in a hot tub, going for extended walks, and experiencing the comfort of familiar surroundings. Women also have reported a sense of accomplishment and readiness for mothering. Midwives attending a home birth stay at least 4 hours after the birth and visit daily thereafter for a number of days. This intensive contact with both the new mother and her family may allow for enhanced opportunities for teaching related to care and feeding of the baby and care of the new mother. Women giving birth in a hospital are discharged within 24 to 48 hours after an uncomplicated vaginal delivery and 72 hours after a caesarean birth. Home visits after the birth are rarely provided by physicians but often are by midwives. In most communities, public health nurses visit new mothers, but are often mandated to provide only one visit if the mother and infant are healthy.

SUMMARY

In summary, healthy women experiencing normal pregnancies may choose to plan a home birth with a qualified midwife. Although no birth is risk free, home birth overall is not associated with increased risk for adverse outcomes for the mother or baby. Women planning birth at home are less likely to experience obstetrical interventions during labor and delivery.

—Patricia A. Janssen

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HOMICIDE

For a person to take the life of another person is in most, if not all, religions and cultures seen as one of the most serious crimes someone can commit. This holds true historically as well because killing has

always been looked on as a serious offence, resulting in diligent investigation and severe punishment.

Homicide is a term used by criminologists—those who study crime and criminals—and sociologists—those who study society and its members—to describe the act of an unlawful killing of another person. The term is used to enable them to discuss and study the whole category of killing as such, without having to take into account that the definition of legal categories such as murder and manslaughter vary with time and place. The term homicide consequently covers the legal categories of murder and manslaughter, whereby murder generally refers to premeditated or intended killings, whereas manslaughter involves less culpability of the offender and thus indicates the killing was not intended or premeditated or was caused in self-defense. In some studies, infanticide (the murder of a newborn child by its mother; see Infanticide entry) is also included in the homicide category, and some researchers argue other forms of unlawful killing, such as corporate manslaughter (when the death of an employee or customer is caused by the company's neglect, carelessness, or noncompliance with regulations), should be recognized in the category. The label of homicide is consequently used to focus on people who die as the result of unlawful acts of other people, and it is the outcome, the fatal result of death, and not the legal requirements (e.g., premeditation, provocation, and temporary insanity) that classify an act as homicide.

As an act, homicide is not as prevalent as might commonly be believed. The actual number of homicides is comparatively low, especially when compared with other crimes like assault or property crimes such as theft, shoplifting, and burglary. What is apparent, however, is that homicide is a crime that is firmly rooted in our everyday lives and experiences. Despite the fact that most of us run a very low risk of ever becoming a victim of homicide, or an offender committing homicide, or even of knowing someone who is a homicide victim or offender, this is a crime that is much feared and much debated. One contributing factor to this awareness and fear of homicide is that murder is a regular feature in news reporting and is a major topic of interest in crime fiction. If the murder rate as experienced in crime fiction series, films, and books would have been the real one, there would not be many people left in the end! There are different reasons that homicide features in media to such an extent. One is that homicide, especially when perpetrated by sex murderers, violent pedophiles, serial killers, and the like, has many titillating and interest provoking qualities. Heinous crimes have an ability to awaken our curiosity. Some of these qualities may be emphasized by the finality of the crime—the fact that the victim dies.

One way of enabling comparisons between different countries with different sizes of population and varying numbers of homicide is to give the rate of homicides per 100,000 inhabitants. This way, countries and regions can be compared with each other. The rate per 100,000 in Western Europe is on an internationally low level, with a rate of 1.6 in the countries in the European Union. The level in Eastern Europe is considerably higher. In the Baltic countries, the rate is about 10 per 100,000, and in Russia, the rate is 22.1. The United States, with a rate of 5.6 homicides per 100,000, falls between Western and Eastern Europe. Higher still is the homicide rate in South Africa, 55.86. Generally, the homicide rate is higher if a country suffers from unrest or conflict, either internally from civil war or externally by being in conflict with other countries. For example, in Northern Ireland, the homicide rate is 2.65. From other countries, like Zimbabwe, Palestine, and Iraq, it is much more difficult to get reliable figures because of turmoil and instability. Studying homicide rates also shows that the homicide rate is usually higher in big cities than in smaller ones and rural areas.

Even if the prevalence of homicide is quite low, however, when someone is murdered, the consequences reach far more people than the victim and perpetrator. The impact on other people—family, friends of victim and offender, witnesses, sometimes the general public—also needs to be taken into account when discussing homicide. Those close to the victim suffer the trauma of loss and sudden death, whereas the surrounding community may suffer from the general feeling of being unsafe, and fear of crime can increase as a result.

Despite homicide being a relatively rare phenomenon, it is far from a homogeneous one. Homicide can be classified in a range of ways, typically sorted by offender–victim relationship (intimate, family, acquaintance, stranger), number of offenders (gang killings) or number of victims (serial, multiple, and mass murders), and motive or scene of crime (home, public space). Generalizations have been attempted; for example, Katz divided homicide into righteous slaughter and cold-blooded murder. The problem with trying to categorize homicide is that there are always types of

homicide that do not fit into general divisions, and there are other situations in which too many different types of homicide fit in one category, diluting the explanatory power of the label.

Usually, categorizations are more detailed and reflect the relationship of the victim and offender. The two most common types of homicide are then domestic and confrontational homicide. Domestic homicide includes spousal homicide, child homicide, parental homicide, and crimes of passion, whereby the death can be the result of years of abuse or related to a more sudden crisis, like a separation or the discovery of infidelity. Confrontational homicide typically denotes male-on-male drunken brawls and honor contests in public places. Other, smaller groups include crime-related homicide (e.g., assassination, armed robbery with fatalities), sexually motivated murder, serial murder, mass murder, and multiple killings.

To connect to what was said previously about the media's portrayal of homicide, the general trend is that the less frequent the homicide type, the more publicity it gets in media. Even when it comes to the rarity and horror of any homicide, it is still not as interesting to write about domestic violence with deadly outcomes, fatal brawls among drug takers, or the pub brawl among young men that leads to someone's death, as it is to follow the killings of a Ted Bundy or the Columbine High School shootings.

How can we explain homicide? Wolfgang (1958) pointed out the personalized trait of homicide and claimed it was the most personalized of crimes. This is because in most homicide cases, victim and offender know each other, if not closely, at least by name. This is why the police always carefully check a victim's friends and family members because the offender is usually found there.

No one has managed to put forward a general theory of homicide, but there is a range of theories that go toward explaining homicide, taking into account childhood, biology, and psychological and sociological factors. The wide range of homicide types means that different kinds of homicide need different kinds of explanations because offender and victim characteristics, motives, crime scenes, and the like all vary depending on homicide type. It might seem obvious that the husband who kills his wife after years of abuse does so for other reasons (frustration, power, and control) than a serial sex murderer (sadistic and perverted sexual drive) or a bank robber prepared to use a gun to get the money he or she wants.

SUMMARY

To summarize, homicide is a rare crime, but it is one that we all are very well aware of and frequently fear as well. Despite its rarity, the impact of homicide extends far beyond the victim and offender—it can have an impact on the whole society. Also despite its rarity, homicide is still far from a homogeneous phenomenon. There are a number of different types of homicide and therefore a number of different explanations, usually varying from individual to individual in what has been called the most personalized of all crimes.

—E. Maria Kaspersson

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HOMOSEXUALITY

The construct of homosexuality can be conceptualized from two major perspectives: essentialist and constructivist. Essentialist assumptions have informed the thinking of many theorists and researchers traditionally associated with human sexuality, such as Sigmund Freud. The essentialist perspective views homosexuality as a core attribute of individual identity. From this perspective, homosexuality is held to be temporally and culturally stable, biologically driven, and internal. As such, its development is said to follow a predictable and predetermined course.

A second perspective, the constructivist perspective, posits that individuals, cultural groups, and social institutions actively define the meanings attached to sexuality, sexual identities, and sexual behavior. In rejecting the primacy of biological determinism and essentialist assumptions, the constructivist perspective holds that theories about sexualities must incorporate a social-psychological focus. Looking to the past and considering how sexuality has been conceived and

lived out during different eras and in different places lends support to the contention that its construction is both culturally and temporally variable. It is really only in recent times that sexuality has been framed as an essential part of the individual, as an identity in and of itself. In fact, the term *homosexuality* was first coined in the late 19th century.

HISTORICAL CONTEXT

Before the 19th century, religion was largely responsible for the social and political organization of sexuality. However, in the past century and a half, the social and political organization of sexuality has taken place in more secular venues. During the late 19th century, interest in sexuality emanated from the medical tradition, wherein the concern was in examining pathology. The emergence of the homosexual in contrast to the heterosexual can be seen in the work of Richard von Krafft-Ebing. Krafft-Ebing's *Psychopathia Sexualis*, published in the late 19th century, became one of the most influential texts on pathological sexuality. In this, Krafft-Ebing's use of the terms *hetero-sexual* and *homo-sexual* introduced the idea of two sex-differentiated eroticisms, one deemed to be normal and healthy and the other abnormal and unhealthy. Krafft-Ebing's main focus was on distinguishing between congenital sexual perversion and acquired sexual perversity. In this context, the notion of a physiologically based sexual orientation (healthy or unhealthy, normal or abnormal) emerged.

In the early part of the 20th century, Freud suggested that individuals were born bisexual and, as life progressed, moved toward either a homosexual or heterosexual orientation. Freud postulated that a restriction in object choice was necessary for the development of normal sexuality. Restriction in object choice occurred through the resolution of the Oedipus complex. In so doing, the individual became exclusively monosexual. Freud suggested that fixed sexual identity was established by the onset of adolescence. He further maintained that homosexuality and heterosexuality could not coexist, and so the basis for exclusivity in orientation was established.

In the United States in the 1940s and 1950s, the work of Kinsey and colleagues was pivotal in influencing ideas about sexuality. Kinsey and his team used a taxonomic method to capture the range of human sexual behavior. They allowed for the complex nature of sexuality by introducing the use of a continuous scale to understand sexual orientation. This scale ranged from 0 to 6, with 0 indicating exclusively heterosexual and 6 indicating exclusively homosexual. They suggested that individuals may fall in any position on that continuum, thus allowing for a range in terms of sexual attraction and behavior. Despite the introduction of the continuum concept in the 1950s, categorical definitions that constructed homosexuals and heterosexuals as opposites continue to be used when talking about sexuality.

IDENTITY DEVELOPMENT MODELS

In the past 35 years, models of sexuality that have been proposed have generally focused on the development of homosexual identity. These development models have primarily focused on gay men, with lesbians most often being subsumed under this group, and with minimal attention accorded to bisexual identity development. Most homosexual identity development models have come from an essentialist position and share a number of common features. Most hold that development of homosexual identity involves a series of stages (e.g., predisclosure, disclosure, exploration, identity development, identity prizing, and identity integration). Other models have adopted more of a sociological approach. These latter models particularly seek to chart the process by which women or men come to construct their identities as gay, lesbian, or bisexual and allied to this are said to exhibit particular attitudes, behaviors, and lifestyles.

CRITICISMS OF CATEGORICAL MODELS

Using categorical definitions of sexuality (i.e., homosexual, bisexual, heterosexual) is clearly part of the dominant cultural script in North America. However, the categorical model of sexuality has been subject to considerable criticism. Often this term has been used to reference sexual identity (usually fixed), sexual behavior, and sexual fantasies simultaneously and simplistically. Many have claimed that these phenomena may not be congruent. Increasingly, sexual orientation, sexual identity, and sexual partner choice are being recognized as independent variables. For example, the National Health and Social Life Survey reported low intercorrelations among dimensions traditionally associated with sexuality and sexual orientation. Specifically, they reported that 4.3% of women and 9.1% of men in the study (N = 2,000) had

experienced some form of sexual activity with a same gender partner since age 18. Additionally, 5.6% of women and 4.5% of men found same-gender sex appealing, with 6.2% of men versus 4.4% of women reporting attractions to someone of the same gender. More than 95% of the respondents identified themselves as heterosexual.

Seeking to capture more of the dimensional experience of sexuality and sexual orientation, Klein and colleagues suggested that sexual orientation is best defined as consisting of seven components: (1) sexual behavior; (2) emotional preference; (3) sexual fantasies; (4) sexual attraction; (5) social preference; (6) lifestyle, social world, and community; and (7) self-identification. These seven components together resulted in the Klein Sexual Orientation Grid. Each dimension can be rated on the Kinsey scale (0—exclusively heterosexual to 6—exclusively homosexual). It is suggested that there may be low or high congruence in ratings among the differing dimensions. Individuals can also rate the grid for past, present, and future sense of self.

When thinking about homosexuality, we are challenged to move beyond categorical, simplistic definitions that confound separate dimensions in an effort to be descriptive. In simplifying this construct, the complexity is lost, and moreover, we fail to allow for the dynamic and fluid nature of sexuality and sexual identity construction. More and more researchers and theorists are advocating examining these constructs more complexly using both traditional and nontraditional methods, thus allowing for the examination of variability in construction and description at the individual and group level.

—Maria U. A. Darcy

See also Bisexuality, Gender Identity, Heterosexuality, Lesbians

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HOPE

References to a concept of hope can be found throughout historical writings and across many different disciplines. Despite the frequency of discussions about hope, there is not one unified description or definition for the concept. Christian scholars frequently characterize hope as a virtue from God in which individuals are confident in receiving an eternal reward. Philosophers provide a range of viewpoints, from hope as a misleading influence, like a mirage that motivates but is unattainable, to hope as an understanding of realistic desires. Hope has most recently been a focus of study for social scientists, who, through research, have defined hope as the mental motivation and plans that a

person has for his or her goals. This latter understanding of hope will be explored in more detail.

COMPONENTS OF HOPE

Hope can be broken down into three basic components: goals, pathway thinking, and agency.

Goals

Any desired outcome, object, or experience that individuals can imagine is considered a goal. A goal can be something tangible, such as wanting to buy a new car, or intangible, such as the desire to win a soccer game. Goals also range from the concrete, as in wanting the car, to the vague, as in the aspiration for success. Likewise, there is variation in the magnitude of goals. At times, they reflect more immediate desires (I will read this article today), and at others, distant wishes (I will complete a doctoral degree in literature).

People set goals constantly, often without realizing it. By reading these words right now you are engaging in behavior that reflects a goal (such as to read this sentence or to gather information about the concept of hope). By this definition, humans engage in goal setting almost constantly. But hope is not concerned with those goals that are assured successes or failures. For literate, educated adults, the goal of reading this sentence is virtually certain to be reached. Hope is an active process. Therefore, the reading goal would not be considered in relation to a person's level of hope because it is not open to change.

All goals are not created equal. One way that individuals can enhance their level of hope is by making their goals more specific. An undefined goal like wanting to be happy may be harder to picture than defined goals such as wanting to make a new friend or finding an enjoyable hobby. Specific goals also facilitate agency and pathway thinking.

Pathway Thinking

For many goals, there are multiple viable routes to reaching them. Pathway thinking is used to identify possible ways to achieve a goal. Pathway thinking can be aided by focusing on specific important goals. Starting with a clear goal will increase one's ability to identify targeted pathways. Similarly, pathway thinking is more active when the goal is important to the individual.

Agency

Agency is the motivation that moves people toward their goals. It is made up of thoughts that relate to individuals' beliefs that they can start working on a goal and continue progressing until the goal is reached. Agency thoughts can include a person's thoughts about his or her competence (I can do it), abilities (I know how to do this), and readiness for action (I'm ready to try). These can be applied to a variety of goals, but certain characteristics of goals make it easier to activate agency. When one imagines an important goal, motivation is more available. For example, an athlete is much more likely to play hard to win a state championship basketball game than a friendly family game of basketball. Furthermore, those goals that are specifically defined are more likely to spark mental energy.

HIGH HOPE EXAMPLE

A high level of hope reflects strong agency and pathway thinking. It is possible for someone to be high in agency but low in pathways (and vice versa), but neither of these alone is sufficient to create high levels of hope. Consider the example of Andrea, a college student who has the goal of earning an "A" in biology class. When Andrea thinks about how to achieve this goal, she is able to generate numerous pathways, including turning all assignments in on time, studying an extra 20 minutes per day, getting a tutor, and organizing a study group before each test. Because she has multiple routes to her goal, Andrea's progress towards an "A" will not be stopped if one of her routes becomes blocked.

Andrea also exhibits high agency. Although the goal may be challenging, she focuses on her desire for a good grade, her willingness to work hard, and her past success as a student. These agency thoughts push Andrea to initiate her pathway behaviors and will motivate her to keep trying when she does encounter obstacles.

BENEFITS OF HOPE

The positive effects of high hope have been demonstrated in many areas of performance. In the area of academics, level of hope at the beginning of the college semester has consistently predicted students' final grades, even when the influence of high school academic performance is removed. What makes this even

more striking is that hope is not correlated with IQ; therefore, the superior performance of high-hope individuals cannot be explained by simple achievement or intelligence. Research with athletes has also found that hope predicts athletic performance, even after controlling for natural physical ability.

Because of their level of agency and ability to identify pathways, high-hope people are more likely to reach their goals. This alone is important knowledge. But people with high hope also tend to do other specific things that help them to cope with life's problems. When they encounter stressful events, people with higher hope do not perceive the events as negatively as do people with lower hope. Presented with a challenge, high-hope individuals concentrate on how to deal with the situation, whereas low-hope individuals begin to worry and focus on themselves. Social support is also stronger among higher-hope people.

Studies of hope and health, both mental and physical, find that higher-hope people have better outcomes. Although hope does not immunize people against illness, it is correlated with lower rates of anxiety and depression, quicker recovery from surgery, and better adjustment to injury and chronic disease.

CHANGING HOPE

Without intervention, a person's level of hope tends to remain stable. But it is possible to strengthen one's goal setting, agency, and way-power thinking. By practicing goal setting with a focus on creating positive and specific goals that represent a moderate challenge, people can create a solid basis for hopeful thinking. For specific activities to measure and improve hope, see the Further Readings and References section.

SUMMARY

Hope is a way of thinking about goals. A person's level of hope reflects the amount of agency and pathways he or she has. Agency refers to the motivation to reach a goal, whereas pathways are workable routes to reach the goal. By increasing one's level of hope, one may experience improved performance in academics, at work, or in athletic pursuits. Higher levels of hope have also been correlated with more positive health outcomes.

—Alicia Ito Ford

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HORMONE REPLACEMENT THERAPY

Hormone-replacement therapy (HRT) is a physician-prescribed program of treatment for women who are experiencing hormonal imbalances, during or after the occurrence of menopause. It usually refers to supplementing the body with the hormones estrogen and progesterone, which naturally decline during menopause, to treat the symptoms that follow.

Estrogen is produced by the ovaries along with progesterone. Together, these two hormones regulate menstruation and ovulation. Menopause occurs as part of a woman's natural aging process when production of these hormones becomes erratic and eventually stops. This may happen over several years. At the beginning, a woman experiences irregular menstrual periods, often accompanied by hot flashes, night sweats, and a lack of energy. Eventually, her menstrual periods stop completely. Long-term postmenopausal symptoms include pelvic organ atrophy, bone changes that range from joint aches to osteoporosis, and circulatory changes such as varicose veins or even high blood pressure. Sometimes, circulatory changes lead to heart disease or stroke.

HRT works by supplementing the body with estrogen or with a combination of estrogen and progesterone, relieving some of the menopausal symptoms. Other beneficial effects of HRT include promoting the amount of HDL ("good") cholesterol and decreasing the amount of LDL ("bad") cholesterol in the blood. HRT slows or stops the loss of bone mass and density (osteoporosis), and may even increase bone density.

HRT may be given in the form of either naturally derived or synthetically produced estrogen. Less potent forms of natural estrogen, termed *phytoestrogens*, are derived from plants and can also be used in HRT. The two most common regimens are cyclic HRT and continuous HRT. The cyclical regimen is designed to mimic the natural menstrual cycle, in which estrogen is taken every day and, for 2 weeks of the month, progesterone is taken also. In continuous HRT, estrogen is taken in conjunction with a lower dose of progesterone every day. Transdermal estrogen patches, which are applied only one to two times per week, can also be used.

The risks associated with HRT include an increase in blood clots, heart attack, and abnormal mammograms when taken short-term. Risks of long-term HRT include an increased risk for breast cancer, heart disease, gallstones, pulmonary embolism, deep vein thrombosis, stroke, Alzheimer's disease, and other dementias. Many of these findings were discovered as a result of the Women's Health Initiative (WHI) study. The WHI is a major research program established by the National Institutes of Health (NIH) to address the most common causes of death, disability, and poor quality of life in postmenopausal women. The study included the assessment of the effects of treatment with estrogen plus progesterone, or estrogen alone, in healthy pos menopausal women. The estrogen-plus-progesterone study was prematurely halted in July 2002 when it was found that the risks (increased breast cancer, coronary heart disease, strokes, and pulmonary embolism) outweighed the benefits (fewer hip fractures and colon cancers). In March 2004, the estrogen-alone trial was also prematurely halted. The NIH reported that this therapy did not appear to affect the risk for heart disease, but increased the risk for stroke in postmenopausal women. This therapy also significantly increased the risk for deep vein thrombosis, had no significant effect on the risk for breast or colorectal cancer, and reduced the risk for hip and other fractures. Because the WHI studies focused on the risks of long-term use of HRT rather than shorter-term use, the NIH recommends that the information obtained should be used by women considering use of HRT for longer than 3 or 4 years. The decision to use HRT should be made after weighing risks and benefits and on the basis of the individual woman's health history and specific needs.

—Roberta Attanasio and Feda Masseoud

See also Menopause

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HORMONES

Hormones are chemical substances that are produced, stored, and released into the bloodstream by secretory structures (glands) of the endocrine system. The endocrine system, in turn, is designed to modulate various body functions, including digestion, metabolism, growth and development, reproduction, and response to stress and injury. Hormones are released by specific glands, move through the bloodstream to target locations, and act there upon cellular "receptors" designed specifically to receive and be activated by particular hormones. Hormones are capable of altering the structure and function of many organs, including the brain. There are more than 50 distinct hormones that play diverse and pivotal roles in development and homeostasis and that may also affect behavior. Among the most well-known are the sex or steroid hormones, including androgen (e.g., testosterone, produced in the testes, ovaries, and adrenals) and estrogen (produced in the ovaries, testes, and adrenals). Alone, these two groups of substances exert widespread effects on the developmental process, as well as throughout life, and will be the primary exemplars of hormones in the following discussion.

HOW DO STEROID HORMONES DETERMINE SEX?

All mammals secrete sex hormones. Beginning in the prenatal period, the process of sexual differentiation begins with genotypic sex (as determined by the presence of sex-specific chromosomes, e.g., XX for female and XY for male), which in turn codes for the development of either testes or ovaries. At this early prenatal stage, both genotypic males and females possess dual sets of duct systems—the müllerian ducts and wolffian ducts. Hence, early in development, the fetus is considered "bipotential" with regard to sex. As the testes or ovaries develop, however, and begin to secrete

hormones, further sexual differentiation of the body occurs. Specifically, the production of testosterone and other male-specific hormones leads to the regression of the müllerian duct system and the formation of the primal male internal reproductive system (epididymis, vas deferens, and seminal vesicle). Conversely, the absence of these male substances coupled with later ovarian output results in a female phenotype (including the development of fallopian tubes, the uterus, and the inner part of the vagina). Thus, structural or "physical" sexual characteristics define phenotypic sex. In most all cases, genotypic sex and phenotypic sex are identical, but occasional hormone anomalies may lead to an outward sexual appearance and behavioral pattern that is inconsistent with genotypic sex.

Hormones also lead to sexual differentiation of the external genitalia and modulate the emergence of sex-specific behaviors. Thus, testosterone directs the masculinization of external genitalia and the organization of male-specific behavior, whereas a lack of testosterone coupled with the later presence of ovarian activity results in female external genitalia (and the accompanying establishment of female-typical behaviors). Following the development of internal reproductive organs, external genitalia, and the organizational effects of hormones on brain and behavior, secretion of sex steroid hormones drops to quiescent levels until the approach of puberty. However, steroid hormones go on to play an important role in the activation of sex-specific behaviors in puberty and adulthood.

HORMONES IN ADULTHOOD

Puberty is marked by the beginning of gametogenesis (the development of an egg or sperm by the gonads), a rise in secretion of sex hormones by the gonads, the accompanying development of secondary sexual characteristics, and the activation of reproductive functions that have been "organized" by early gonadal hormone secretions. These behaviors may reflect permanent alterations to brain structure and function, which nevertheless require the presence of circulating hormones to trigger their activation. This explains why reproductive behaviors are not seen (or occur at much lower levels) in prepubertal mammals, even though the groundwork for the display of these behaviors appears to be laid down in the brain early in development, during the process of sexual differentiation.

Mammalian females, for example, are characterized by an ovarian cycle. After puberty, females show cyclic production and release of ovarian hormones that are in turn responsible for activating female-typical sexual behaviors. Such behaviors have been studied extensively in nonhuman mammals, particularly rodents (i.e., sexual receptivity and mating behaviors). Moreover, these sex-typical female behaviors have been shown to be conditional on the presence of estrogen and another ovarian hormone, progesterone.

Sexual behaviors in male mammals are also dependent on the presence of hormones. Testosterone is secreted by the testes and activates sexual behaviors such as penile erection and mating behavior. In the absence of testosterone, sexual behavior is severely compromised. However, testosterone is converted into two different metabolites, dihydrotestosterone (DHT) and estrogen, and these two by-products appear to have different effects on behavior. For example, it has been shown in rodents that one behavior (penile erection) is induced by the conversion of testosterone into DHT, whereas other behaviors (mating behaviors) are activated when testosterone is converted intracellularly into estrogen. Moreover, these androgen metabolites act in different areas of the brain (estrogen) and body (DHT) to mediate these different sexual functions.

One obvious question arises as to how estrogen can exert both feminizing effects in females and simultaneous masculinizing effects in males. One possibility that could account for these differing effects of estrogen involves differences in the relative amounts of estrogen between the sexes. Specifically, in males, estrogen appears mainly within the cell, where it has been actively converted from circulating testosterone into estrogen, and intracellular levels of estrogen derived through this metabolic pathway are much higher in males than intracellular levels of estrogen in females. In addition, estrogen may act on different structures and at different time points in male and female development.

HORMONES AND COGNITION

Hormones also play a role in behaviors other than sexual behavior. For example, men generally have been shown to outperform women on tests of visuospatial ability, whereas women perform better on tests of verbal fluency and perceptual speed. It should be noted that these differences are typically small, particularly as compared with population and individual variability, and are largely irrelevant to issues of gender, ability, and career choice. Nevertheless, studies have shown

that performance on some cognitive tasks may be influenced by circulating levels of hormones (in fact, hormone levels may be as important as gender in mediating some of the observed sex differences in cognition).

In support of this view, animal research shows that neonatal testosterone affects a number of measures of cognitive performance, shifting it in a male-like direction. However, female hormones also influence aspects of nonsexual behavior. As one example of the complexity of sex differences in nonreproductive behavior, spatial navigation behavior has been shown to differ in male and female rats. Moreover, it has been shown that males and females utilize different strategies to complete the same task. Finally, some aspects of cognitive performance, which involve the use of differing strategies, appear to change over the ovarian cycle, specifically changing with fluctuating hormonal levels. Thus, it appears that "sex" differences on cognitive tasks may be not just a function of gender but also of circulating hormones.

HORMONAL MANIPULATIONS

Throughout life, humans also manipulate their hormonal levels to achieve different outcomes. For example, anabolic steroids (which represent synthetic forms of testosterone) are used by athletes for their effects on the musculoskeletal system (i.e., increased lean body mass and increased muscle strength). Oral contraceptives also represent hormonal manipulation, in this case used to prevent pregnancy in females by altering estrogen and progesterone. These two hormones, which direct many of the processes surrounding the menstrual cycle, work by preventing an egg from being released from the ovaries most of the time and also make the uterus a hostile environment for an embryo by causing a thinning of the uterine lining. Evidence suggests that both anabolic steroids and oral contraceptives may exert some effects on cognition and emotions, although the specific nature and pattern of these effects remains unclear.

HORMONES AND AGING

As we age, our hormonal levels also decrease. In females, ovulation ceases after middle age, and in males, testosterone levels decrease with age. In postmenopausal women, there is a decline in the ovarian production of estrogen that results in estrogen deficiency. This deficiency is associated with a number of health problems as well as cognitive and behavioral changes. A way to compensate for these changes involves the use of hormone replacement therapy (HRT). This therapy supplements the age-related decline in naturally produced estrogen and progesterone with an external source, although controversy indicates that the negative side effects of HRT may outweigh benefits for some women. In males, testosterone levels decrease with age, and they experience similar cognitive and mood changes, as well as a loss of sexual drive. One way to deal with the latter problem is with drugs designed to combat the decline in testosterone and its effect on sexual performance. For example, certain drugs can be used to exert a direct influence on male erectile mechanism, specifically by working on the brain and spinal cord pathways that control penile erection. The male counterpart to dealing with declining estrogen and progesterone levels in women is to take testosterone. However, there are few studies to date addressing the effects of HRT in men, and preliminary evidence suggests both beneficial and detrimental effects on health and cognition. Some studies addressing the influence of HRT on cognition in aging males show that testosterone enhances spatial memory and possibly verbal and working memory, whereas other studies show no influence on cognition. A similar discrepancy exists for aging women and HRT. Although some studies have shown that HRT has a positive effect on verbal memory and mood, others have not found significant differences between users and nonusers of HRT on any cognitive measure.

SUMMARY

The data discussed here represent only a small portion of the many effects that hormones exert on human physiology. In this entry, sex steroids are addressed as an exemplar, given the highly significant effects these substances exert across the human life span. However, many other hormonal systems affect metabolism, sleep, stress, and other systems, and the reader is referred to one of the excellent resources below for more information on these diverse effects.

—Melissa McClure and R. Holly Fitch

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HOSPICE

Hospice is a philosophy of care for people who have terminal illnesses and their families through the use of an interdisciplinary team that develops a coordinated, individualized plan of care. The focus of such care is on pain management and symptom control, within the context of maintaining quality of life for the dying patient and his or her family. In this respect, death in the hospital (or nursing home for that matter) is "hidden," in contrast to the death of a person in hospice, which is real, human, and meaningful. Rather than view death as the end of life, death in hospice is better thought of as "spiritual transformation" from this life to the next. This redefined notion of death in hospice is predicated on the basis of the fact that death need not be accompanied by suffering; that is, that such care is palliative, and that the patient's and family's wishes will be identified and honored. In effect, death and dying in hospice are a natural event, in contrast to dying in an institution, the many problems of which have begun to be addressed by societal and professional efforts to humanize dying by defining the rights of dying persons and by making recommendations about how end-of-life care might be improved. Such efforts were stimulated by the failure of project SUPPORT, which attempted to enhance the quality of life for dying patients by improving the communication skills of health care professionals (i.e., physicians). Although hospital care has been characterized as *event oriented* (focused on the prevention of the event of death), hospice care is *process oriented*—dying is its focus.

In North America, five models of hospice care exist: (a) home-based care, often provided by community-based professionals and volunteers (90% of Hospice care is provided in the patient's home); (b) home-based care provided by home health care agencies, or Visiting Nurse Associations (VNAs); (c) free-standing, full service, autonomous hospice facilities; (d) separate hospital-based palliative (pain-reducing) care units; and (e) hospital-based subacute units, emphasizing continuum of care. In addition, some hospices have begun to explore the concept of adult hospice day care. Pediatric hospice programs are also becoming more common. About half of all hospices are hospital based, and the remainder are operated by home health care agencies. Most (nearly 75%) are nonprofit in nature, whereas 15% are for-profit. One third are free-standing facilities. It is also becoming more common to see nursing homes and assisted-living communities provide hospice care. Although most hospice patients have cancer, people being cared for by hospice also die of acquired immune deficiency syndrome (AIDS), end-stage renal disease, dementia, and cardiovascular illness.

Regardless of one's model of hospice care, all hospices share certain characteristics that set them apart from other forms of health care: (1) the dying person and family are the unit of care; (2) the interdisciplinary team serves both the dying person and the family; (3) care focuses on both the physical and psychosocial aspects of dying; (4) services are available on a 24-hour per day, 7 days per week basis; (5) inpatient and home care services are available; and (6) bereavement counseling and support (both before and after the individual's death) are available to both the dying person and the family. Many, if not all, of these issues are reflected in the dying person's perception of what is important at the end of life.

These characteristics reflect some very basic ideas about life and death: (1) that dying is a natural experience, with life and death being equally important and meaningful aspects of our existence; (2) that dying people and their families are important in themselves, with the dying person's welfare coming first; (3) that dying people should be able to continue to make decisions for themselves until they are unable or unwilling to do so; and (4) that dependence on others and being cared for by them are not demeaning.

The essential one-on-oneness of the hospice care philosophy has historically stood in contrast to the cure orientation of conventional hospital oncological care or the maintenance mentality of the nursing home. In this light, hospice patients are less likely to receive intensive medical interventions such as chemotherapy or surgery as well as diagnostic tests (e.g., blood tests, X-rays) in the weeks before death than are those in conventional hospital oncology units. Moreover, although analgesics are also more likely to

be regularly prescribed for pain on a fixed schedule in conventional health care, pain medication is prescribed on an as-needed basis in hospice.

HISTORY AND ORIGINS OF HOSPICE CARE

The primary stimulus for hospice in America came from the St. Christopher's hospice in London, founded by Dr. Cecily Saunders in 1967, although hospices clearly had existed for many years in Europe. Since then, initiated by the opening of a home-based care hospice, Hospice, Inc. in New Haven, Connecticut, in 1974, nearly 3,300 hospices have been founded in North America. Changes in attitudes toward death, legal decisions and legislation affirming the right of the individual to refuse life-sustaining treatment, and the development of the Medicare Hospice Benefit have also encouraged the expansion of hospice in the United States. Other events important to the development of hospice are the founding of the first hospital-based hospice in North America—the palliative (pain-reducing) care unit at the Royal Victoria Hospital in Montreal, and the formation of the National Hospice Organization (NHO) in 1977 (now known as the National Hospice and Palliative Care Organization [NHPCO]). In 1992, the principal fund-raising arm of the NHPCO, the National Hospice Foundation (NHF), was founded. NHPCO has been important in educating the public about hospice and in formulating standards for quality hospice care critical to their accreditation, which makes hospice a viable alternative to institutional care for terminally ill persons and their families.

Hospice care became a recognized benefit under Medicare in 1983. Studies have shown that although dying persons represented only a small percentage of all Medicare beneficiaries at any given time, such persons were consuming a disproportionate share of all Medicare expenditures. Three years later, legislation was passed permitting state Medicaid programs the option of covering hospice. The hospice benefit under Medicare requires that core professional services—physician, nursing, counseling, and medical social work services—be directly provided by the hospice. However, it does not require that hospices directly operate home care or inpatient care facilities. Rather, Medicare simply requires that the hospice staff maintain responsibility for all services regardless of their location and that they guarantee access to such services on a 24-hour basis. The same concerns regarding the costs of acute care for dying persons that convinced Congress to establish a Medicare benefit have moved private health insurance companies toward hospice coverage. Even when covered by Medicare, hospice costs are sometimes unnecessarily paid by patients and families because questions about private health insurance coverage were not asked.

HEALTH CARE DELIVERY IN HOSPICE

Case management ensures that quality care is available to, and continuous for, each patient and family. This is especially important because patients and families often know little about caregiving and may have difficulty in dealing with other agencies. The coordination of care within the interdisciplinary team, as well as with other professionals outside of hospice, is an essential component of the case management mold in hospice. Case management matches each unique patient-family unit with whatever services they may need, as well as monitoring changes in their needs for such services. Case management also helps patients and families arrange for insurance coverage, plan for emergencies, and if necessary, arrange for services from other agencies. In hospice, case management is often carried out by the primary care nurse or the social worker.

The care plan for the patient and family is implemented with the patient's and family's needs in mind. It is likened to a process—something that patient and family actively participate in. Information about the patient's needs is often gathered by interactions with patient and family, and such information is assessed by the interdisciplinary team in formulating a care plan. The team also arranges to coordinate and deliver hospice services, monitors the effectiveness of these services, and if necessary, reevaluates the care plan if the patient's physical or emotional status changes. Numerous decisions regarding everyday changes in the dying person's energy level, emotional state, functional (decision-making, self-care) skills, and needs for pain medication must be made by the team, yet balanced against the quality of the dying person's life as well as against the demands of work, school, raising children, house cleaning, cooking, and bill paying. Additionally, changes in the family's needs for support and information are likely. For example, the patient and family may initially ask about insurance coverage, the nature of the illness, its progression and treatment, or what the family can do to help to care for a dying loved one. They may also want to know about the side effects of

pain-relieving medications. As the patient's condition worsens, needs for reassurance and support may surface, and concerns about planning a funeral, writing a will, or living without a loved one may be shared. Near death, the family may be less verbal about their needs, and emotional support from a staff member or volunteer may be all that they require. Rather than "doing" something, hospice personnel may meet this need by simply "being there."

LEGAL AND ETHICAL ASPECTS OF HOSPICE CARE

NHCPO does not support either suicide or euthanasia in hospice, and indeed, they are infrequent among hospice patients. However, there is the occasional individual for whom "rational" suicide or euthanasia may be perceived as an alternative to living in pain or dying an undignified death. Although such statements may mean that the patient's needs are not being met by the hospice, they may also reflect family difficulties, resulting in the dying person's feeling rejected and unloved. Suicidal thoughts may be shared openly, or they may remain unexpressed. Such patients may have a hard time sleeping or eating, refuse medications or visitors, or suddenly change a will. A wish to commit suicide may reflect an individual's particular moral values about the quality versus quantity of life. If such concerns do surface, one should explore whether they are shared by family members, and if they are not, or if family members are unaware of them, the caregiver must make a choice regarding whether to discuss them with the family. In most cases, it is preferable that the patient's wishes to discuss suicide or euthanasia with his or her family be respected. Many hospices have adopted a policy against active euthanasia and against the acceptability of suicide. What death and dying mean to each person should be explored, so that the dying patients can understand and clarify their feelings as to why suicide or euthanasia might be preferable to living, and so the caregiver can more fully understand the dying person. Not discussing such topics or making them seem unimportant suggests communication difficulties that must be remedied quickly.

INTERDISCIPLINARY TEAM

Hospice uses the interdisciplinary team in tending to the well-being of dying patients and their families, and has been demonstrated to be effective in this respect. The term *interdisciplinary* reflects the variety of skills that professionals, paraprofessionals, and volunteers contribute in meeting the complex and changing physical, psychosocial, and spiritual needs of the patient and family. In this regard, the team functions to ensure that the dying patient and family function as well as possible given the burden of having a terminal illness and the realities of daily life, including maintaining a household, holding a job, and raising children. Not only are the patient's medical needs given priority, but also the patient's and family's needs for intimacy, privacy, and support from relatives, friends, or neighbors must be met. As the essential component of hospice, the team functions to evaluate and meet the special requirements of each patient-family unit. Within the plan of care that has been developed for the patient and family, the patient care coordinator, who is often the social worker or nurse, brings together each member of the team to assure continuity of care. Not only is this vitally important during the period of time the patient is actually receiving hospice services, but it is also essential to providing effective bereavement support. Such support is especially critical if the staff sense that the family wishes to disengage from them after the death.

Ideally, the team is composed of people with a mix of professional expertise and background: nurses, social workers, clergy, physicians, counselors or psychologists, dietitians, physical therapists, pharmacists, and volunteers. For the most part, direct patient hospice care is managed and carried out by nurses in either inpatient or outpatient settings, under the direction of the hospice medical director in concert with the patient's physician. Important roles are also played by clergy, social workers, and especially volunteers. In most cases, teams meet on a weekly or semi-weekly basis to review each case and to discuss problems encountered in carrying out the plan of care, as well as to discuss problems within the patient-family unit itself. As noted earlier, the care plan may need to be modified for any number of reasons.

Physicians have direct input into the delivery of care and are primarily responsible for the direction of the medical care that includes both ongoing, daily, and emergency care. Physicians formulate a medical regimen of pain and symptom control using an array of narcotic and nonnarcotic analgesics (pain-relieving drugs). In hospice, however, the physician's role is best defined in the context of the entire team and most likely varies a great deal from hospice to hospice. In rare cases, the role of the physician may be minimal, and the physician

may not actively function as the medical director or as a participating member of the team. Relative to the more traditional physician, hospice physicians are more likely to play a less authoritarian role in the delivery of care. They are more patient and family oriented and emphasize more strongly clear, effective, and empathic communication with both patient and family as well as with other hospice staff. Perhaps the physician's most important role, other than in prescribing pain medication, is to serve as a liaison between the hospice and physicians in the community as well as with the patient's personal physician, from whom referrals often originate, and whose attitudes about hospice are critical in this respect.

Nurses in hospice often make an initial assessment visit with the family, and because they see the dying person most often, frequently oversee the coordination of direct patient care among the team. In an initial visit, the nurse learns about the history of the illness from both the dying person's and the family's point of view, and assesses their needs to help the hospice care team to design a care plan. The nurse is equally attentive to the emotional needs and physical well-being of the patient and family. Relieving pain promptly, wherein pain often but not always accompanies a terminal illness, and keeping the patient as pain free as possible, are vitally important. Listening and "normalizing" everyday life are also very important aspects of the role that the hospice nurse plays.

Although nurses often provide most of the direct, hands-on skilled care, the social worker may also serve as a case manager. The social worker often conducts the initial psychosocial assessment of the patient-family unit, dealing with such issues as insurance coverage, pensions, wills, and funeral planning. Although medical social workers may function similarly to the nurse regarding the family's well-being, they usually assume primary responsibility for tending to the financial and legal aspects of terminal care with the family, and in helping the family obtain outside assistance with home care, meal planning, or meeting transportation needs. The social worker also often oversees the follow-up bereavement care of the family.

The volunteer assists the patient and family in a variety of ways on a continuing as-needed basis. Volunteers can, by simply listening and observing, monitor the family's physical and emotional status so that a crisis of caregiving can be avoided. Volunteers can also help in the provision of care itself: turning patients in bed, personal grooming and hygiene, helping with household chores, picking up children from school, and most important, simply being present. Volunteers have been and are viewed as an absolutely essential component of the hospice team and should function as such. In most hospices, a volunteer coordinator helps match and assign volunteers to patients and families and may assist in coordinating and delivering volunteer training. By accompanying the nurse or social worker on an initial visit, the volunteer coordinator can learn about each family's background, interests, and unique needs that influence hospice care, as well as form an impression of each family member as a person.

The role of the clergy is usually more subtle and often only on a demand basis in hospice, although it is difficult to generalize about the extent of their involvement. Clergy are involved in the team to shed light on the spiritual needs of the patient, and if the patient has no religious affiliation, to minister to the patient and family. Rather than promoting a particular religious philosophy, the chaplain sees to the patient's spiritual well-being by being a link to the religious community. The chaplain often assists in bereavement follow-up, as well as in the training of volunteers. The chaplain can also function as counselor, listener, problem solver, mediator, or friend, as can the hospice administrator, depending on his or her training, over and above the overseeing of personnel and reimbursement issues within the hospice.

Few hospices actually have a psychologist as a paid staff member or a volunteer, although this is changing as the patient-family unit's emotional well-being is being recognized as an even more important influence on the health of the dying person and his or her family. Moreover, hospice staff members offer more counseling than any other activity other than providing nursing care. The psychologist or counselor, for the most part, plays a supportive role in consulting with the team regarding the psychosocial functioning of the patient or family. Counselors' or psychologists' expertise is sought regarding family conflicts associated with the stress of terminal care, or long-standing difficulties that are brought to the surface by the dying of a family member. Such conflicts often interfere with either the delivery of care or the patient's or caregiver's well-being.

BURNOUT AND ATTRITION IN HOSPICE

Stress among hospice workers is unique in that uncertainty about whether one's efforts are effective,

the duration of time spent with patients, and the importance attached to one's work are all high. Although individuals vary in their ability to appraise and respond to stress, the unique commitment hospice staff have to their work and the demanding nature of working with dying people make them especially prone to stress and burnout. Most hospices now recognize that some form of regular, timely staff support is crucial to lessening stress and minimizing staff turnover, although this has not always been so. Staff with little family support, who work in home care–based hospice situations, appear to be at greater risk for job stress and burnout. Younger and less mature caregivers also seem to be more prone to dysfunctional stress reactions owing to a lack of emotional preparation, as do people who are more death anxious or who are trying to cope with the loss of a loved one by immersing themselves in hospice. Given that burnout predicts the long-term attrition of hospice staff, perhaps most important to minimizing burnout is the selection of hospice staff. Excluding people who have experienced recent personal losses as well as those with a great deal of anxiety or concern about their own deaths or about being around dying people is important. Over and above the selection of team members, the team itself must have time to be alone with one another to discuss technical and creative issues, as well as to express their feelings and provide emotional support to one another regarding their work. Taking care of oneself is central to lessening hospice team stress and burnout. Moreover, opportunities for continued training and cross-disciplinary sharing outside of hospice are essential to minimizing attrition.

PATIENT-FAMILY DYNAMICS IN HOSPICE

Although the needs of the dying person are an important focus of hospice, that person is nevertheless embedded in the matrix of relationships and interactions with other family members. Death may disrupt patterns of communication, role responsibilities, decision making, and assertions of power or dominance within the family. The very identity of the family and of the individuals in that family may be threatened by death. Each family's reaction to the diagnosis of a terminal illness, its management of a loved one's dying, and its postdeath functioning are determined by previous family styles and patterns of coping. The impact of death also varies by whether a parent or a child dies, interacting with what stage of the family life cycle the family is in.

When hospice care is provided by the family at home, caring for a dying loved one can present an additional burden the family may see as impossible to cope with. The family must believe that home care is both possible and desirable, and they must have access to professional assistance as well as specialized equipment often essential to quality terminal care. The family must also have the nursing skills to make physical care possible. Moreover, knowing when death is imminent, what to do at the moment of death and what to do immediately after death are important skills and knowledge that are important in choosing home care. Families report that changes in the dying person's mental status (inability to communicate, confusion, seizures), and such changes in his or her inability to care for oneself are the most troublesome, as are administering medications and dealing with the loss of bladder or bowel control. Putting personal and career goals on hold, having little "alone time," being isolated from others, feeling guilty, and neglecting one's own health are also sources of stress among caregiving families. Recent findings suggest that families who have a loved one dying of AIDS face even greater difficulties. Such families express more difficulty in sharing their feelings, report more stress, are less trusting, and have more illness anxiety than families with other terminal illnesses. Hospice staff can help in the performance of many of these needed tasks through education of the family and through the provision of psychological and spiritual support to them. In most cases, details that seem unmanageable, horrid, or repulsive become less so with a bit of hands-on teaching and knowledge. As hospice care extends beyond the death of the patient, it is also important to observe how both the patient and family deal with their grief because it influences the postdeath adjustment of survivors. Opening up lines of communication may help families face the reality of a loved one's death, particularly if they have had little recent contact with the dying person or when there are long-standing family difficulties.

In evaluating the patient-family unit, the focus is likely to be on the woman's well-being, health, and extent of social support from others because female spouses tend to experience more family caregiver burden than do both men and children. Indeed, psychosocial and emotional support to primary caregivers by family is crucial. It is also helpful to explore the extent to which family caregivers are depressed, whether they have used social services in the past, and their explanations for the dying person's behavior because these

factors have also been found to predict caregiver burden and may constitute adjustment difficulties in themselves. Such insight may require several visits to achieve and may necessitate an assessment by more than one hospice staff member. An evaluation of the family's support system is also crucial to understanding how they will cope with the illness—do they have extended family, friends, neighbors, or coworkers available? What area support agencies have they contacted (e.g., nursing home, home health care services)? Do they have savings or private insurance? How much of the cost of care is Medicare likely to cover? Has a will been written? Have funeral arrangements been made? Do they attend or are they members of a church? Would a visit from the hospice clergy be helpful? Through all of this, the family should sense this active support and interest in their welfare and functioning by hospice staff. In cases in which significant family dysfunctional patterns are interfering with care, more formal family therapeutic interventions may be necessary.

GRIEF AND BEREAVEMENT IN HOSPICE CARE

Bereavement follow-up is a primary characteristic of hospice, and it sets hospice apart from other types of health care for dying persons and their families. In many respects, the job of the formal caregiver has just begun when the patient dies. The family must be sustained and cared for well beyond the death of a loved one, and bereavement care facilitates the expression of grief before death and thereby lessens its severity after death. Because the same personnel are encouraged to stay in contact with the family, this ensures continuity of care. Different staff, however, may be involved to encourage the family to develop new relationships.

The major objectives of hospice bereavement care are (1) accepting the reality of the loss of a loved one, (2) experiencing the pain of grief, (3) adjusting to an environment without a deceased family member, and (4) reinvesting energy into other relationships. At present, research growing out of the National Hospice Study suggests that although hospice bereavement programs can be very beneficial, objective evidence supporting their efficacy is sparse; however, the odds of a surviving spouse dying in the 18 months of his or her spouse's death are greater if hospice is not used. In addition, better postdeath adjustment has been found among spousal survivors who used hospice.

Bereavement care is often carried out by social workers, nurses, or volunteers. Bereavement care often focuses on those whose grief is pathological, or on the identification of persons who might have later difficulties in coping. A variety of very diverse bereavement services are offered by hospices. These include attending the funeral, providing individual or group counseling, sending postcards, making telephone calls, and holding memorial services and other social events. The intensity of involvement by individual hospice staff or by the interdisciplinary team varies, as does the formality of objective bereavement follow-up. Counseling, companionship, and assessment are the prime reasons reported by staff for bereavement visits, and persons in home-based hospices typically receive more bereavement support and counseling than do those in hospital-based hospices. Related to such bereavement support is the fact that people in home-based hospices are more emotionally distressed and experience more caregiver burden before death than those in hospital-based hospices. Because hospice care places a special burden on those family members caring for a loved one at home, individuals who have suffered more because of the demands of caregiving may fare more poorly after death.

A FINAL WORD

Perhaps the greatest lesson that hospice teaches us is that people can grow spiritually and emotionally by being with a loved one at a very sad and emotionally difficult time of life. This lesson is vividly expressed in the words of the wife of a hospice patient who died of cancer:

> Knowing that your spouse has a terminal illness is not all bad. It gives you time. Time for all the things you might otherwise not do. Time to talk, mend bridges, get to know each other better, and even time to fight through the things that you need to fight through. This great thing we call time allows us to let go of that loved one without regrets. We can say goodbye and mean goodbye with all our hearts. The time spent preparing for my husband's death is probably the most valuable time of our 17-year marriage. Perhaps in your mind that casts a shadow over our marriage. I think not. I believe that we were very typical of the great percentage of couples. We got caught up in the work of life and often lost contact with each other. We were fortunate to be extremely close and in tune to one another, but we still got caught up in our own

personal strives for survival. Had Ray suddenly dropped dead one day we would not have had 6 months to bond and prepare. I am fortunate to be able to say that I have no regrets after Ray's death.

—Bert Hayslip, Jr.

See also Death

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HOT FLASHES

The hot flash is a sudden sensation of heat typically experienced by women during their menopausal years, although they have been reported among young women during various phases of the menstrual cycle. Flashes (also called flushes) are the most common complaint of women in the menopause transition. The heat sensation generally begins in the chest and radiates to the face, head, and arms. Women may also report feeling palpitations or anxiety with hot flashes. Other sensations reported include feeling nauseated, pressure in the head or chest, and a feeling of suffocation. Some women who experience hot flashes also complain of a reduced ability to concentrate; however, the relationship between hot flashes and memory is not well understood. At times, women report having night sweats and not hot flashes, although the two terms refer to the same physiological phenomenon.

For researchers, clinicians, and even the casual observer, hot flashes can be identified by the visible changes that accompany them, including skin flushing,

increased skin temperature, and sweating. These characteristics provide the basis for assessment of hot flashes through measurement of skin and central body temperature, measurement of skin moisture, and analysis of skin conductance for clinical or research purposes.

In the United States, 75% to 80% of women undergoing the natural course of menopause and 95% to 100% of women whose ovaries are surgically removed experience hot flashes. Generally, hot flashes occur in women 40 to 60 years of age, with 87% experiencing them daily and about 30% reporting more than 10 flashes per day. Hot flashes are usually experienced over a period of 1 to 5 years but may last for more than a decade. Some women experience only one flash per month, whereas others have one per hour; alternatively, some 15% to 20% of postmenopausal women do not experience any hot flashes during the menopausal transition. Distress associated with having hot flashes varies among women from those that are barely noticeable to severe episodes of flushing, sweating, and feeling hot. Severe hot flashes can significantly disrupt activities of daily living, including work and sleep. In addition to being disruptive, hot flashes may be embarrassing in social situations.

Although prevalent during the menopausal transition, the cause of hot flashes is still not well understood. The hot flash is known to be related to estrogen decline as the number of follicles diminishes in the aging ovary. However, estrogen does not directly cause hot flashes. It appears that estrogen decline alters basic processes in the brain, which leads to the hot flash. These relationships are currently under investigation.

Various factors that can trigger hot flashes have been identified. These include consumption of hot drinks, spicy foods, alcohol, or caffeine as well as smoking cigarettes. Such identifiable triggers can be controlled to reduce hot flashes.

There are currently two effective treatments available for women experiencing hot flashes. Hormone replacement therapy (HRT) is the gold standard in treatment of menopausal hot flashes; HRT has been the cornerstone of therapy since the 1950s. It is the only therapy for hot flashes approved by the U.S. Food and Drug Administration (FDA). HRT generally reduces the frequency and intensity of hot flashes but may eliminate them completely for the duration of hormone use. Black cohosh, an herbal supplement, has also been demonstrated to be effective in treating hot flashes. Eight clinical trials have shown both the safety and effectiveness of black cohosh. Other treatments reported to reduce hot flashes are acupuncture, vitamin E supplements, exercise, and biofeedback. However, scientific evidence to support use of these therapies is lacking.

—Sharon L. Dormire

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HUMAN GENOME PROJECT

Determining the sequence of the human genome has been compared in significance to Neil Armstrong's first steps on the moon and to revealing the "book of life." At the White House announcement of completion of a draft sequence, the achievement was described by President Clinton in 2000 as "Without a doubt . . . the most important, most wondrous map ever produced by humankind."

The word *genome* is used to describe the entire DNA sequence of an organism. The cells of all plants and animals contain two copies of the genome—one inherited from each parent—except of course for the germ cells (eggs and sperm), which contain a single copy. The DNA (deoxyribonucleic acid) is tightly coiled on chromosomes, of which there are 23 pairs in humans. If all of the DNA in a single human cell was stretched out, it would be about 2 meters in length. DNA consists of two antiparallel strands coiled into a double helix. The strands are held together by hydrogen bonds between molecular structures known as *bases*. The bases on each strand are held together by a sugar-phosphate backbone. The length of DNA is measured in base pairs (bp), with the entire human genome being about 3,000,000,000 bp in length.

The DNA contains all of the information required to synthesize each of the proteins present in every cell and

the manner in which each is expressed. For example, although there is a subset of proteins that every cell requires to survive, there are others that are specific to liver cells, kidney cells, or nerve cells. The information (or code) for each must, however, be in every cell because all plants and animals develop from a single fertilized egg. The portions of the genome that code for proteins are referred to as *genes*. The DNA around each gene contains information controlling gene expression—so that liver proteins are made in liver, kidney proteins in the kidney, and so forth. Alterations in the DNA sequence encoding proteins may result in corresponding changes to the protein sequence as well. These changes (mutations) are the direct cause of inherited diseases such as cystic fibrosis, muscular dystrophy, and sickle cell anemia. Other diseases such as heart disease and hypertension are believed to result from different mutations in different genes. Some sequence differences do not cause diseases at all, but are necessary for there to be variation in a population—otherwise, everyone would look the same. Furthermore, if there are no changes in DNA sequence, animals and plants would be unable to adapt to changing environments, and species would not evolve.

The possibility of identifying each and every gene was first discussed in the mid-1980s after a few viral genomes had been sequenced and the construction of the first human gene maps had been accomplished. The U.S. National Research Council (NRC) endorsed the notion in a report in 1988. The Human Genome Project (HGP) officially started on October 1, 1990 under the oversight of the U.S. National Institutes of Health (NIH) and Department of Energy (DoE) in conjunction with United Kingdom's Wellcome Trust and Medical Research Council, and subsequently involved scientists from France, Germany, China, and Japan. The 15-year, $3 billion project envisioned the determination of the complete human genome sequence after the generation of detailed genetic and physical maps and the development of high-throughput, efficient sequencing technologies while determining the genome sequences of model organisms such as *Escherichia coli*, yeast, a worm, fruit fly, and mouse.

Eventually, two parallel approaches were taken to sequence the genome. In the first, the HGP cloned human genomic DNA into fragments of about 100 to 200 kilobase pairs (kb) in bacterial artificial chromosomes (BACs), organized these clones into overlapping series, sequenced each BAC, and then assembled the sequence using the order of BACs to make sure the sequence was in the proper order. In the alternative approach, employed by Celera Genomics, the genome was broken into fragments of 2, 10, and 50 kb, sequenced from either end, and reassembled. Every base was sequenced 5 to 10 times from different clones, and the ends of each clone were a known distance apart (mate pairs). This latter approach ("shotgun sequencing") only became feasible with the development of high-throughput automated sequencers (by Applied Biosystems) and the design of the necessary assembly algorithms. Both approaches had to handle the substantial repeat content of the human genome that affects both the mapping of BACs and the assembly of sequence. Independent drafts of the genome sequence were completed in 2000, and an essentially complete sequence was finished in 2003. The efficiency of the shotgun approach allowed the rapid determination of the genome sequences of mouse, rat, mosquito, chicken, and many other species from 2001 to 2004. The finished human sequence has been shown to be 99.99% accurate (i.e., no more than one mistake in 10,000 bp).

An important result of the HGP has been the delineation of the genes encoding all of the proteins that make up the human body and those that regulate its development. These proteins are encoded by about 20,000 genes. Because humans usually regard themselves as more complex beings than flies or worms, it was surprising to find that, in comparison, the fruit fly genome has about 13,000 genes and the nematode genome about 19,000. Comparison of genes between species indicates that mammals have more regulatory genes than invertebrates, perhaps allowing for more complex developmental processes. Another surprising observation is that the protein coding sequences account for only 1.2% of the entire genome and that nearly half of the genome is composed of repeated sequence elements. However, by comparison with the mouse genome, about 5% of the human genome can be seen to be under active selection. It is believed that most of this conserved sequence is made up of elements that regulate the expression of nearby genes. Now that the genome sequences of different mammals (mouse, rat, dog, chimpanzee), as well chicken, frog, and fish, have been determined, it is possible to compare the human sequence to each of these species to identify parts of the sequence that have been conserved over hundreds of millions of years of evolution and that are presumably important in regulating the developmental processes that animals have in common. On the other hand, the differences between closely related species should help identify the cause of specific

characteristics. For example: Why is a rat bigger than a mouse? Why are humans taller than chimpanzees?

Another important observation is that the genome sequences of any two unrelated people are 99.9% identical. The 0.1% difference is the variation that makes each of us different—taller, shorter, brown hair, blond, and so forth. There is actually more difference within a large geographically defined population than between two populations (e.g., between the population of northern Europe and China). Thus, the grouping of individuals by skin color has no more biological relevance than grouping by height or shoe size. Scientists are now using this variation between individuals to identify the genes that predispose people to heart disease, diabetes, hypertension, asthma, and other disorders.

Rapid technological advances are expediting these studies. Over the course of the HGP, the cost of DNA sequencing was reduced by more than 100-fold from about $10 per base to less than $0.10 per base. Scientists are now working to lower the cost to $1,000 per *genome*, so that personalized medicine becomes feasible for everyone. It should be possible to accurately predict the chances of an individual developing cancer or heart disease by examining their DNA sequence, rather than their family history and diet. It will also be possible to identify the best drug to treat individual patients, knowing how different drugs will act in people with variation at specific genes.

—Iain McIntosh

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HUMAN IMMUNODEFICIENCY VIRUS (HIV)

The human immunodeficiency virus (HIV) is a retrovirus. A retrovirus is a type of virus that has viral RNA in its nucleus instead of DNA. The primary targets of HIV in the human body are T4 or T-helper cells. T4 cells help to organize the immune system's response against a foreign invader (e.g., virus, bacteria, fungus). HIV attaches itself to T4 cells then inserts its genetic material into the cell. Through various chemically initiated changes, the viral RNA becomes viral DNA and makes its way into the nucleus of the T4 cell. The T4 cell becomes an HIV-producing factory. Eventually, the infected T4 cells die, and their numbers decrease, which leads to a weakening of the immune system. When a person's T4 cell count drops below 200, which is roughly 70% immune damage, they are diagnosed with acquired immune deficiency syndrome (AIDS).

There are two types of HIV: HIV-1 and HIV-2. HIV-1 is the more common of the two types and is more easily transmitted. HIV is found in all body fluids. However, the quantity of HIV in bodily fluids varies, with blood, semen, and vaginal fluids having the highest concentration of viral particles. Unsafe sexual practices, injection drug use, and transfusions are the main causes of infection. Most people exposed to HIV test positive 2 weeks to 6 months after exposure. Some people changing from HIV negative to HIV positive (called *seroconversion*) experience viremia or severe flu-like symptoms.

HIV was first identified in 1981. It is believed to be related to simian immunodeficiency virus (SIV). Researchers discovered that chimpanzees were exposed to SIV by eating monkeys. Over a long period of time, chimpanzees became resistant to the disease. Humans are believed to have been exposed to SIV through hunting chimpanzees for bush meat. Because of the 98% comparability of genetic material between humans and chimpanzees, the virus began to infect human beings, a process called *zoonosis.*

HIV is unique in world history as being one of very few pandemics or worldwide epidemics. It is estimated that up to 46 million people worldwide are infected with HIV. Most infected individuals are adults; however, up to 2.9 million children are estimated to be infected with HIV worldwide. In 2003, 3 million adults and children died from AIDS.

Drugs have been developed that can keep levels of HIV in the blood very low. Persons infected with HIV must take combinations of two or more antiretroviral drugs, also called *highly affective antiretroviral treatment* (HAART). There are three broad classes of antiretroviral drugs, which attack HIV at various stages in

its life cycle. Currently, 22 drugs are approved to treat HIV, with many more being researched. However, there is no cure for HIV. In people with AIDS and those who have sustained damage to their immune system, antiretroviral drugs keep viral levels low, but researchers continue to search for ways to rebuild the immune system.

Researchers are hopeful that a vaccine for HIV will be found. Until a successful vaccine is developed, behavior change remains the key method of preventing new HIV infections. Despite prevention efforts, 5 million new cases of HIV were reported in 2003. Also of concern are the millions of orphaned children in Africa from AIDS, and the growing number of people infected with HIV in Asia and other parts of the world. Finally, many countries cannot afford the drugs to treat HIV. Therefore, getting antiretroviral medications to developing nations will be a key focus for the world.

—Carlos Escoto

See also Sexually Transmitted Diseases (STDs), T Cells

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HUMOR

Humor is closely related to play; indeed, it can be viewed as a form of "mental play." When we engage in humor, we are playing with words and ideas. Compared with other forms of play, however, humor involves a more deliberate distortion of reality. For example, a child engaging in "serious" make-believe play might dress up in her mother's high-heeled shoes and evening gown and apply lipstick in a way that closely imitates adult behavior. On the other hand, in humorous play, the child might put the dress on backward, wear the shoes on her hands, or use the lipstick to give herself a clown face, in order to create a surprising effect and elicit laughter in others. This distortion of reality is an aspect of incongruity, which is a defining characteristic of humor. In general, *incongruity* refers to a discrepancy between what is normally expected and what is actually experienced.

To recognize and enjoy humorous incongruity, children must first have an understanding of what is "normal" or expected. The development of humor through childhood therefore parallels the increasing complexity of cognitive structures and reflects an increasing sophistication in the detection of incongruity. Laughter first appears in infants about 4 months of age. During the first 2 years of life, much of children's humor focuses on observing and performing various forms of visual and behavioral incongruity, such as peek-a-boo, tickling, and chasing games. Children at this age also laugh at incongruous actions of people, animals, or objects, such as exaggerated facial or vocal expressions or seeing a dog wearing a hat. Later, as children begin to develop language skills, they start to laugh at incongruous uses of language, such as sound play (e.g., repeating nonsense rhyming sounds) and word play (e.g., deliberately calling a person or object by the wrong name).

By the age of 4, children typically begin to enjoy semantic incongruity, which is often expressed in the form of riddles. As they reach elementary school age, their humor involves conceptual incongruity, such as telling jokes that incorporate multiple meanings. In adolescence, their increased capacities for abstract thinking and formal logic are reflected in even more sophisticated forms of humor such as satire and irony. Many researchers believe that, like play in general, humor serves an important function of enhancing cognitive and linguistic development by enabling the child to practice and consolidate newly acquired skills.

Humor also has important social functions. It is a beneficial way of sharing fun and forming bonds among friends. However, it can also be used in aggressive ways (e.g., through teasing and "put-down" humor). Humor is often a way of defining and reinforcing group norms by communicating what is acceptable and what is unacceptable, and making fun of those who are different. Children with a strong sense of humor often tend to be more aggressive and dominant than their less humorous peers. At the same time, they also tend to be more creative, verbally fluent, self-confident,

extraverted, and socially competent. Thus, a sense of humor can be channeled toward either socially facilitative or aggressive ends.

Humor is also an important way of coping with anxiety and stress. By laughing and joking about something that is potentially threatening, one gains a sense of mastery over it. Young children's enjoyment of "bathroom" humor and adolescents' sexual jokes may be seen as ways of coping with anxieties and insecurities relating to bodily functions and sexual development. Throughout our lives, humor continues to be an important mechanism for coping with stress and adversity. Thus, despite its "frivolous" appearance, humor plays an important role in our cognitive, social, and emotional functioning.

—Rod A. Martin

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HUNTINGTON'S CHOREA

Huntington's disease (HD) is an inherited brain disorder named for Dr. George Huntington, who first described this disorder in 1872. HD is now recognized as one of the more common genetic disorders. HD currently affects 30,000 Americans, and nearly 250,000 more are at risk for this disease. At present, there is no known cure.

This disorder was traditionally known as *Huntington's chorea* (after the Greek word for dance) because of the involuntary movements associated with HD. The gene that causes HD is known to code for a specific protein called *huntingtin*. Mutant huntingtin is thought to be more resistant to destruction than normal huntingtin, which leads to toxic buildup and cell death. The HD gene is located on the tip of the short arm of chromosome 4 and was isolated in 1993 by the Huntington's Disease Collaborative Research Group. The discovery of this gene led to the development of a genetic test that can accurately determine whether a person will develop HD. However, there is as yet no test that can predict when symptoms will begin.

The gene causing HD is dominant, meaning that only one copy of the Huntington's gene is necessary to develop the disease. Each parent who possesses one HD gene has a 50% risk for passing on the gene to each of their children. Everyone who carries the gene will develop the disease eventually, and it appears most frequently after age 30. These symptoms rarely appear in infants, but children who do develop the juvenile form of the disease rarely live to adulthood. Death usually occurs 15 to 20 years after onset of the disease.

Early symptoms appear as slight physical, cognitive, and emotional changes. Physical changes can include nervous behavior, clumsiness, alterations of handwriting, and difficulty with normal skills such as driving. Cognitive changes can involve problems with organization and dealing with novel situations, short-term memory loss, and impairments in decision making and attention to detail. Emotional changes can include periods of depression, apathy, irritability, and impulsiveness and changes in personality. In some cases, a person may become delusional or paranoid. At-risk individuals should not worry about the occasional appearance of some of these symptoms because these incidents happen to everyone and do not necessarily indicate the onset of the disease. The person dies, not from the disease itself, but from complications such as pneumonia, heart failure, choking, or infections developing from the weakened condition of the body.

The symptoms of HD are associated with atrophy of the caudate nucleus, particularly the head of the caudate. Reduced metabolism and blood flow have been observed in the caudate nuclei of HD patients using positron-emission tomography (PET) and functional magnetic resonance imaging (fMRI) as well as other methods. This reduction has been found to precede caudate nucleus atrophy. There is no known cure for HD, but a number of treatments have been proposed. Drugs antagonistic to dopamine D2 receptors reduce the chorea of early HD, and some experimental treatments may help to decrease the aggregation of the huntingtin protein.

In summary, HD is a fatal genetic disorder due to mutation of a specific gene and currently has no cure.

Research is progressing to identify the exact mechanism of cell death and methods to stop it, with the hope that one day this disease may be conquered.

—Vincent P. Clark

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HYDROCEPHALUS

The Mayo Clinic reports that about 4,000 infants in the United States are born with hydrocephalus, and an estimated 6,000 children develop hydrocephalus during the first 2 years of life. The mechanics of hydrocephalus are interesting. The spinal cord and the brain are cushioned or protected from jarring injury by the systemic flow of cerebrospinal (CSF) fluid. If there is a blockage in some portion of any cerebral pathway, fluid can build up. This blockage can be acquired or can be congenital. The obstruction of the channel and buildup of CSF fluid are the dominant characteristics of hydrocephalus.

The word *hydrocephalus* originates from two Greek words: *hydro* means "water" and *cephalus* means "head." Hydrocephalus is then a condition in which excess fluid (CSF fluid—not water) accumulates in the brain due to (1) oversecretion of CSF, (2) obstruction of CSF passages, or (3) impaired absorption of CSF. The signs and symptoms of this condition vary depending on the age when the symptoms initiate. Because the skull bones of an infant are not yet fused, continued pressure causes the expansion of the head in all directions; it expands to accumulate the buildup of the CSF fluid, which can result in an increasing head size. There are numerous common signs in infants, in addition to an unusually large head. These symptoms might include vomiting, developmental delay, and depending on the amount of fluid buildup, seizures. In older children, there may be a slowing of development or loss of already achieved development; physical symptoms including nausea, vomiting, and headaches; and problems with motor skills, like balance and coordination.

Hydrocephalus is a serious condition because as CSF accumulates, it displaces and kills neighboring neurons, the building blocks of the central nervous system. The condition is very treatable; however, some children have developmental delays, muscle tone and movement issues, eye movement and speech impairments, and feeding problems. Once the condition is diagnosed, the most imperative goals are to reestablish the flow—absorption and production—of CSF between the brain and spinal cord and reduce the pressure in the child's head. There are two typical treatment options. The most common course of treatment is the placement of a shunt (a tube) inside the head to regulate the flow of CSF. This tube runs under the skin into the stomach or abdomen. The shunt track can irritate surrounding brain tissue and increase the potential for seizures. The second, less common (although gaining in acceptability) treatment is endoscopic third ventriculostomy (ETV). This procedure allows for creating an alternative pathway around the blockage that allows the CSF to flow unimpeded.

Hydrocephalus can also occur as a secondary effect to some other pathological event or process. This

could be either prenatal or postnatal in origin. For instance, some prenatal disorders, such as spina bifida, Dandy-Walker malformation, Arnold-Chiari malformation, and stenosis of the aqueduct of Sylvius, often result in the buildup of excess CFS fluid in the brain. Other causes of hydrocephalus, both prenatal and postnatal, include infections (meningitis, encephalitis), vascular abnormalities, tumors, cysts, and other disease processes.

—D. Tighe Cooke

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HYPOTHESIS

In scientific research, a hypothesis is a statement about a predicted relationship between variables. A good research hypothesis can be formulated as an "if-then" statement:

- *If* a child is exposed to the music of Mozart, *then* that child's intelligence will increase.
- *If* students learn a math lesson by interacting with a computer, *then* they will solve math problems more accurately than students who learn the same lesson by listening to a lecture.

Notice that a hypothesis is not a question. It is a statement, a prediction that requires the researcher to go out on a limb and say what he or she thinks will happen in a given situation. When stating a hypothesis, the researcher *must* run the risk of being wrong—a scientific hypothesis must be falsifiable.

Hypotheses come from many sources. Researchers are not all wildly creative people, but they do tend to be careful observers of the world around them. One's own everyday observations can lead to the formulation of a hypothesis, as when a babysitter observes that "children who eat ice cream before bedtime have a harder time falling asleep." That simple observation can lead to a formal hypothesis about the relationship between sugar consumption and sleep onset. A famous hypothesis in social psychology was generated from a news story, when a woman in New York City was murdered in full view of dozens of onlookers. Instead of simply shaking their heads in sadness, psychologists John Darley and Bibb Latané developed a hypothesis about the relationship between helping behavior and the number of bystanders present, and that hypothesis was subsequently supported by research. This type of reasoning from a specific case to a more general principle is called *inductive logic.*

Reading existing research and theory can also lead to the generation of hypotheses. Through the process of *deductive logic,* a general theory leads to the prediction of a specific effect or conclusion. For example, someone who is familiar with Piaget's theories of human development might predict that "if a child is younger than the age of 12, then that child will be unable to solve an abstract reasoning problem." Such a hypothesis could then be put to the test in systematic research.

Hypotheses can be either *directional* or *nondirectional.* A directional hypothesis states a specific prediction about the precise type of effect that a variable is expected to have on another variable—for example, "If the number of bystanders increases, then the probability of any given bystander rendering help decreases." A nondirectional hypothesis states that a relationship will exist between two variables, but it is not specific about the nature of that relationship: "If the number of bystanders increases, then the probability of any given bystander rendering help will change." This type of hypothesis can be confirmed if the probability of help increases *or if it decreases.* Nondirectional hypotheses are useful in the early stages of research in a given area, when the researcher may not have enough information to make a more specific prediction. A nondirectional hypothesis is still falsifiable, however, if the data suggest that there is no systematic relationship between the variables after all.

Whether directional or nondirectional, a good research hypothesis must ultimately be objectively testable. Before actually turning a hypothesis into a study, the researcher must develop operational definitions of the variables stated in the hypothesis. If the hypothesis postulates that "If a child is exposed to the music of Mozart, then that child's intelligence will increase," then the researcher must define what specifically is

meant by "child" (a person under the age of ?), by "intelligence" (a score on a particular standardized test, perhaps), and what it means to be "exposed" to the music of Mozart (Which compositions by Mozart? For how long? Played how loudly?). Thus, the development of the hypothesis is only the beginning of the process of psychological research.

—Lori R. Van Wallendael

See also Scientific Method

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I

IQ Tests

An intelligence test sometimes shows a man how smart he would have been not to have taken it.

—Laurence J. Peter

ID

The id (Latin for "that thing") is present at birth and developmentally is the oldest of the three psychological structures proposed by Sigmund Freud as part of the mind. According to Freud, neither the ego nor the superego is active or even formed so early in the individual's development, when the id serves as the storehouse for all the instincts. Initially, all the psychic energy available in the system is invested in the id, which uses this energy to satisfy basic needs through reflexive or reflexive-like behaviors. These needs must first be satisfied if (1) the organism is to survive (again, self-preservation), and (2) the organism is to move on to higher, less biologically and more socially based needs (again, species preservation).

In its most basic form, the id is an inborn biological structure that has as its purpose immediate gratification and reduction of tension. As the initial reservoir of psychic energy, it accomplishes this primary goal of tension reduction through the pleasure principle (also referred to as the principle of lust, the pleasure-pain principle, or the lust-unlust principle). The pleasure principle states that the primary goal in mental operations is the achievement of pleasure through gratification.

Controlled entirely by the pleasure principle, id energy is under no constraints and makes no distinction between fantasy and reality. Thought that does not distinguish what is real from what is not real is called primary process thinking. For example, in the older child or adult, a need can become temporarily satisfied by means of remote representation of the drive object (or that which satisfies a need), perhaps in the form of an image. Daydreaming is thought to exemplify this type of thinking. For example, thinking about a favorite food when one is hungry may relieve hunger pangs for a short period of time. Although daydreaming or primary process thinking satisfies only temporarily, it is an effective way of discharging stored energy and reducing tension so that the tension does not dominate one's thinking.

The psychic energy associated with the id is unconscious in that the individual is unaware of it and cannot talk or think about it. All of the psychic energy associated with the id is unlabeled, or without any verbal associations. It is not available to higher mental processes, and the emotions and feelings associated with it cannot be considered on a rational basis. For this reason some Freudian psychologists believe that events that occur when the child is preverbal cannot be remembered.

The unconscious urges of the id remain active throughout life, but, as healthy development proceeds, a smaller and smaller proportion of psychic energy becomes associated with the id, and more and more psychic energy becomes associated with the more socially adaptive ego and superego.

—Neil J. Salkind

See also Ego, Ego Development, Psychoanalytic Theory, Superego

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IDENTICAL TWINS

When two fetuses are carried simultaneously and delivered by a woman, it is termed a *twin birth*. Most multiple births are twins. In 1997, 94% of multiple births reported were twins. However, most of these twin births were *fraternal* or *nonidentical twins*.

Twins referred to as *identical* or *paternal twins* (also known as monozygotic or uniovular) are much less common than nonidentical twins. They are derived from a single fertilized egg. During fertilization, only one ovum (or egg) is impregnated by only one sperm. Afterwards, the egg divides into two separate embryos. Each embryo has the same chromosomes, they are mostly identical in appearance, and are always the same sex. In rare cases, the division is not complete and results in conjoined twins. The degree of union may be great or slight, and the twins may be conjoined at any part of their bodies. The majority (70%) of conjoined twins are females. Most conjoined twins do not survive long after birth, although there are some who have lived as long as 63 years.

The term *identical twins* is somewhat of a misnomer and is not generally used in professional medical language; monozygotic is more often the term used. The main difficulty is that identical twins are not necessarily identical. Frequently one twin has a physical feature (i.e., mole) that the other does not, for example. More dramatically, some identical twins are "mirror images" of each other, even though they have the same DNA. In such rare cases, one twin's heart is on the left side (normal) and one twin's heart is on the right side (mirror image). The parents of twins can usually tell them apart by subtle visual cues. While their fingerprints are generally similar, they are not identical. Because physical appearance is influenced by environmental factors and not just genetics, identical twins can actually look very different. The only true means of determining whether or not same-sex twins are fraternal or paternal is through DNA testing.

The rate for identical, or monozygotic, multiples is random and universal; it is the same in all populations regardless of race, heredity, or other factors, and it has remained constant over time. The chance of having identical twins is about 1 in 285. Improvements in the early detection of twin gestations through the use of ultrasound techniques, improved prenatal care, and medical advances in the care of neonates have increased the survival rate of twins.

All multiple pregnancies are automatically considered "high risk." Twins are eight times more likely than singletons to be born at a weight of less than 1,500 grams or **very** low birthweight (VLBW). More than one half of all twins are born with low birthweight (LBW) (less than 2,500 grams). This compares with only 6% of singletons born with LBW. Additional risks for the infants include prematurity, underdeveloped lungs that can lead to respiratory distress syndrome (RDS), cerebral palsy, hearing or vision problems, developmental delays, or learning disabilities. Risks for the mother include preeclampsia (a rapid rise in blood pressure, protein in urine, and fluid retention), anemia (low red blood count), preterm bleeding, preterm labor, gestational diabetes, blood clots, and miscarriage. There are thought to be many more twin conceptions than births, as often one or both fetuses are lost during the first trimester to miscarriage or vanishing twin syndrome. As would be expected, families of twins face increases in financial burdens, marital stress, childcare issues, and a multitude of other adjustments.

Some identical twins have been known to switch places with each other in school to have their twin take tests for them, or to play tricks on others. An interesting part of many identical twins development is the emergence of idioglossia, or "twin language." Identical twins also are thought to be able to read each other's minds, and to develop a special bond unlike any other interpersonal relationship. There is great interest in researching the unique and intriguing aspects of identical twins.

—Mary P. Gass

See also Twin Studies

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IDENTITY

The problem of identity is where psychology merges with culture. Human beings are biological creatures, to be sure. But among the myriad species on our planet, we are strongly given to the absorption of story into our being, so that we are self-consciously biographical creatures, needing reminders from time to time that we are animals as well. We are animals who inherit and create history; we take seriously our religions, our nationalities, our kinships, our racial markers, and our occupational and professional achievements and failures. We are identified by these and other markers—some transient, some permanent.

We are bathed in culture from birth. A name is given—in Western culture, a first name to provide distinction, a surname to provide connection. Words are spoken to the mewling infant, a preposterous exercise, it would seem—but one that lays down the fundaments of social identity. Given the medium of language, children can learn who they are—can come to see themselves, more or less, as others see them—as having a particular name and connection to others via family, as having a gender and a race and a nationality, and perhaps even a religious identity. As children grow, they acquire more social connections—in schools, on playgrounds, in the streets, in the fields, and by coming to participate, selectively to be sure, in such opportunities for human affiliation as are afforded by the host society. Identity is both given and acquired.

Identity is so pervasive in human experience that the meaning of the term itself can be slippery. Indeed, the term is used in a variety of senses in contemporary psychology. Social psychologists refer to identity as congeries of social roles and perceptions of those roles. Piaget thought of identity as a cognitive achievement, so that a young child is at some point able to see that objects, including human objects, retain their essential identities even though they are reshaped or transformed. Conservation of identity is demonstrated by an exercise described by Michael Lewis, wherein a child of 3 years of age touches his or her own rouged nose while looking in a mirror, as opposed to the behavior of a younger child, who reaches out to touch the rouged nose of the "person" in the mirror. The identity problem is implicit in Freudian psychology, with the parents serving as the major vehicles for connecting the child to the civilization in which, all unknowing, it came to be born. Identification is the major mechanism for socialization, in the Freudian view. The ego psychology that is the intellectual product of many of Freud's followers can be seen centering about the problem of human identity.

ERIK ERIKSON'S THEORY OF IDENTITY DEVELOPMENT

Erik Erikson is the first psychologist to give identity a central position in his psychology. In his seminal work, *Childhood and Society*, Erikson extends, develops, and reshapes the basic psychoanalytic position on the development of human identity. For Erikson, human development proceeds through eight distinct stages, each succeeding stage building on the accomplishments of the previous stage, as an architectural construction is laid together from its foundation upward.

Erikson's eight stages of social and emotional development are not described as conditional upon the particularities of culture or historical epoch. Rather, they are meant to stand as a universal progression, given in the nature of things, like the Freudian stages of psychosexual development of which they are an extension. Of course, the way in which an individual traverses these stages is not posited as uniform, but is subject to the vagaries of external influences. Each stage, in fact, is thought to be accompanied by a "psychosocial crisis," which demands resolution of some kind before the next stage be confronted.

The stages are as follows:

1. *Basic Trust vs. Mistrust*. First 2 years of life. The child is either loved and nurtured into being trustful, or neglected or mistreated, producing insecurity.

2. *Autonomy vs. Shame*. Ages 2 to 4 years. Success at this stage produces a child with self-assurance, pride, and self-control. Tantrums and displays of stubbornness are part of the work toward autonomy. Failure to overcome the crisis at this stage produces a lasting sense of shame.

3. *Initiative vs. Guilt*. From about 4 to 6 years of age. Healthy children learn to play with others, including the initiation of play activities. Failure to achieve this broadening of social life produces a child who is overcome with shyness and guilt, hanging back from social engagement.

4. *Industry vs. Inferiority*. From about 6 years of age until about 12. At this stage, the child learns mastery of major social conventions, including how to relate to peers, as well as mastering basic intellectual skills, such as reading and writing and quantitative skills. Children who have negotiated the previous stages successfully are likely to be successful at this stage as well. Insecure, shamed, and guilt-ridden children are likely to fail at primary school tasks.

5. *Identity vs. Diffusion of Identity*. This period is that of adolescence—ages 13 to 20. The primary task of this stage of development is to develop a solid answer to the question, "Who am I?" This will entail experimentation with the borders of propriety, of legality, of acceptable social conventions. Successful resolution of this stage results in a young person with a strong and stable sense of who they are, success in their sexual identity, male or female, and a sense of potential achievement in life. Failure produces delinquency, withdrawal, and an unclear sense of identity, including confused gender identity.

6. *Intimacy vs. Isolation*. The young adult can experience the sort of intimacy that produces successful marriages and enduring friendships. Once again, failure in the previous stages of development leads to failure in this later stage—producing isolation.

7. *Generativity vs. Self-absorption*. The successful outcome of adulthood is the generation of children and creative personal achievements. The self-absorbed individual is seen by Erikson as incapable of achieving this kind of extension.

8. *Integrity vs. Despair*. The person who has negotiated all of the previous crises successfully is now ready to assume a position as a wise elder in society, showing acceptance rather than fear, pride rather than despair.

It seems evident now that the progression Erikson described with such confidence in the era just after World War II is a vision of identity development shot through with the ideals and values of the times. Critics have noted that the model here seems distinctively masculine and decidedly unsympathetic to forms of identity that depart from the standards of heterosexual marriage and the production of children. It has been noted as well that Erikson developed this progression "out of his head"—that is, it is not the product of systematic or documented observations about the ways in which development occurs. Even so, Erikson must be credited with having established identity as a central term in human development and with having argued persuasively that human development must be regarded as a lifelong process, not something that is finished with childhood.

RECENT DEVELOPMENTS

Contemporary conceptions of human identity are sensitive to differences in cultural norms. It is generally conceded that there is no universally correct progression of identity development. This is clearly illustrated by cases in which identity conflict becomes manifest by the conjunction of differing cultural norms.

Benson provides an excellent illustration of such a conflict. In 2002, a woman of Kurdish origin was murdered in Sweden by her father, an immigrant to Sweden, because of her announced intention to marry a Swedish man. Her father had grown up in Turkey, immersed in Turkish/Kurdish culture, wherein the father bears responsibility for upholding the honor of his family. The young woman grew up in Sweden, where individuals are supposed to have the right to make their own choices about intended mates, not adhering to the preferences of parents. As Benson notes, her "hierarchy of feelings with respect to identity-relevant decision-making did not synchronize with that of her father." Her death resulted not from a conflict between good and evil, or the failure of the socialization of identity, but rather from a conflict between two quite divergent versions of what is good.

Henri Tajfel has developed a theory of social identity based on the premise that social affiliations are formed rapidly and have great power as determinants of

social action. His "minimal group" group experiments have shown that random assignment of individuals to groups immediately produces a loyalty to the group and barriers with respect to outgroups. In actual practice, social identities are highly complex and layered, as the illustration of the conflict between Swedish and Turkish/Kurdish culture demonstrates. As William James pointed out in his seminal chapter on "The Consciousness of Self," we have as many identities as there are groups about whose opinions we care. Since our world is now characterized by an unprecedented freedom of access, directly and symbolically, to other groups and cultures, it is increasingly clear that the problem of identity is of absolutely central importance to the understanding of the relation of the individual to the social order, and in turn, of the psychological health and well-being of the individual as such.

—Karl E. Scheibe

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ILG, FRANCES (1902–1981)

Frances Lillian Ilg, MD, was born in Oak Park, Illinois. A pediatrician and professor at Yale, Ilg was a pioneering scholar in infant and child development and cofounder and first director (1950) of the Gesell Institute of Child Development (now the Gesell Institute of Human Development) and recipient of the Snow award for Distinguished Service to Humanity.

Ilg came from a large family. It was remarked by Gesell that she may have learned to value collaboration and question the predominant behavioral paradigm due to her large natal families. She graduated from Wellesley in 1925 and Cornell Medical School as a pediatrician in 1929. She interned at Saint Mary's Hospital for Children in New York. Her position at the New England Hospital for Women and Children impressed her with the need for preventive pediatrics and initiated her passion to capture and write about "the natural history of the child." Ilg also worked at Bellevue Hospital in New York City and was a child health worker in Stockholm. She adopted her daughter, Tordis Kristen, as a single parent, unusual in 1936. She wrote that her years of looking at child behavior closely mirrored her daughter's developmental stages.

Ilg started her work and collaboration with Dr. Arnold Gesell at the Yale Clinic for Child Development. Together, using the guidance nursery, clinical examination suite, and photographic processes, Ilg and Gesell coauthored *Feeding Behavior of Infants*. This was the first of more than 30 collaborative works to be authored and coauthored through the work of the Yale University initiated school of child development, the first in the United States. The study of maturation, showing a pattern of similar growth and benchmarks for youngsters, ran counter to the prevailing paradigm. Her work not only targeted the physical aspects of children, but also the social, emotional, and intellectual growth patterns. As thousands of children were seen at the clinic, careful scientific databases were collected, including rich cinematic records and meticulous observations of children to validate the findings. Parents and records of family interactions were also included. The collaborative nature of her work continued with Dr. Louise Ames and Dr. Janet Rodell as Ilg and the team recognized, investigated, and expounded on the biological timetable functioning in conjunction with the surrounding social milieu. As a maturationist, Ilg also authored the *Gesell Developmental Assessment Manual* in 1965. She wrote the widely syndicated daily column, "Child Behavior" for many years.

In collaboration with Gesell, the world-renowned trilogy exploring youth and development was written, including *Gesell Institute's Child from One to Six*, *The Child from Five to Ten*, and *The Years from Ten to Sixteen*. This material is still available at local bookstores and referenced in child development literature as well as popular writing.

—J'Anne Affeld

See also Ames, Louise; Maturation

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IMAGINARY AUDIENCE

Originally used to represent the false belief that one is being watched and evaluated by others, David Elkind proposed that construction of an imaginary audience during early adolescence was a form of "adolescent egocentrism," which he saw as a natural outgrowth of the transition to Piaget's formal-operational stage of cognitive development. Adolescent egocentrism is reduced as adolescents' cognitive capabilities become more refined and as more social experience is acquired.

Research has not supported the theoretical connection between the acquisition of formal-operational abilities and the imaginary audiences. Other developmental theoretical models of the imaginary audience involving identity exploration and the development of social perspective-taking skills have been tested, but have received little empirical support. Nevertheless, the imaginary audience construct has remained of interest to developmental and clinical psychologists for its presumed connection to what appear to be common facets of adolescents' experiences, such as feelings of self-consciousness and susceptibility to peer pressure.

Currently, the best-supported theoretical approach to the imaginary audience construct is the "New Look" model, which states that adolescents experience a heightened tendency to think about themselves and others in social scenarios to cope with concerns resulting from the process of separation-individuation. During this process, adolescents must balance their competing needs to pull away from and stay connected to parents. Multiple studies have shown a positive relation between imaginary audience ideation and separation-individuation concerns, particularly those reflecting concern regarding interpersonal connection. The New Look model has relocated the imaginary audience construct within a new developmental framework, and has redefined its basic nature. The belief that others are attending to and evaluating one's every move would be just one possible example or variety of imaginary audience thinking under this newest model.

In fact, how to measure the imaginary audience has been a major obstacle in its study. The two most commonly used survey measures do not assess the original crux of the construct—that is, that adolescents incorrectly believe others attend to and evaluate them. The two classic operational definitions—feelings of self-consciousness and the belief that it is important to anticipate how others will react to oneself—do not require the misperception of others' attention and evaluation. Both could result from the correct perception of others' attention and evaluation; their relative absence could reflect a false belief that others attend to oneself in an admiring fashion.

Recently, alternative methods have been used: When asked to rate the attentiveness, criticalness, and admiration of hypothetical peer group conversations in which another peer was mentioned in a critical, admiring, or nonevaluative manner, adolescents' and early adults' ratings were not significantly different. Performance on memory tests for conversation content did not support the classic notion of the imaginary audience as indicative of an adolescent tendency toward distorted social cognition. When given an ambiguous peer group conversation, in which the evaluative tone and target of the group's comments were unclear, roughly one out of five participants across four age groups (children, early, middle, and late adolescents/early adults) said the group was talking about them. The best predictor of perception of self-as-target was the interpretation of the group's comments as admiring in nature.

While references to the imaginary audience continue to appear in textbooks discussing early adolescence, the use of newer methodological approaches continues to challenge the information typically presented. Much about the imaginary audience remains to be discovered. In particular, what is the normative developmental trajectory for the imaginary audience, and what role does it play in adolescent development? Are there cultural differences in imaginary audience ideation? Longitudinal and cross-cultural studies would provide answers to these as-of-yet unanswered questions.

—Lesa Rae Vartanian

See also Cognitive Development

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IMAGINARY FRIEND

Imaginary friends are a charming part of early childhood and beyond. Between one half and two thirds of children create such friends, and they come in all shapes and sizes. Some children create imaginary companions that are ordinary playmates with common names. Other companions have unusual qualities, like the ability to fly or magical eyes that can see around corners and over long distances. Imaginary companions are also sometimes animals, such as a friendly monster who comes out at bedtime or a group of cows that need bottles and diapers. These fantastical friends may stay long enough to play for an afternoon, or become part of the family for months or years.

Imaginary friends are usually classified into two types: invisible companions and personified objects. Invisible companions may have no basis in reality, but some are based on real people, or on story, movie, or television characters. Personified objects are usually stuffed animals or dolls that children animate and treat as people, much like Christopher Robin thought of Winnie the Pooh in A. A. Milne's children's stories. Most imaginary companions are regarded as friends or playmates, although children with personified objects sometimes nurture them the way a parent nurtures a child.

Many imaginary friends appear when children are in preschool. However, children in elementary school also have pretend friends, although they may talk about them with others less frequently than younger children do. Moreover, adolescents who keep journals sometimes address them to imaginary friends, suggesting that this type of fantasy is not limited to one age group.

In general, children with imaginary friends are similar to children without them. The two groups tend not to differ in intelligence, creativity, or shyness. Preschool children with imaginary friends have just as many real friends as do their peers, so the idea that children create pretend friends because they have no real friends is unfounded. Children with and without imaginary friends differ most often in birth order and sociability. Specifically, firstborn or only children are more likely to have imaginary friends than children who are later-born. As for sociability, although the differences are modest, children with imaginary companions appear to be highly sociable, cooperating willingly with adults and peers and participating in social activities within the family. These children may also have a predisposition toward fantasy play, preferring pretense over other activities. Lastly, some studies find that more girls than boys create imaginary companions, although boys engage in other types of imaginative play.

Children who create imaginary friends know that these companions are not real. These children are just as good at distinguishing between fantasy and reality as children without imaginary friends. In fact, having an imaginary friend appears to facilitate the development of social cognition, or thinking about other people. For example, the creation of an imaginary companion has been positively related to the development of theory of mind, or the ability to explain and predict other peoples' behavior in terms of their beliefs, thoughts, and desires. Pretending to have an imaginary friend may give children practice in thinking about other minds and may help them to appreciate the fact that what a person thinks and what is actually true may not be the same.

Although children with imaginary companions are often portrayed by the media as suffering from psychopathology, almost all children with imaginary companions create them for fun and in the course of play. The orientation toward fantasy and social interaction shown by these children appears to manifest in their creation of imaginary friends when other people, especially siblings and peers, are not available to play with them.

—Tracy R. Gleason

See also Cognitive Development

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IMAGINARY THINKING

Imaginary thinking occurs when the contents of our thoughts escape the boundaries of the here and now, such as when we reflect on the past or imagine the future. Sometimes the content of imaginary thinking is accurate or realistic, but frequently our thoughts go beyond what is true or likely as we contemplate fictional worlds and nonactual possibilities. Although prototypes of imaginary thinking might include a child's imagined conversation with an invisible friend or an adult's creation of a fictional narrative, imaginary thinking is also involved in mundane everyday activities (e.g., planning for the weekend). Thus, imaginary thinking or imagination should not be equated with special creativity or "imaginativeness." Imagination is an essential component of creativity, but theorists such as Paul Harris have conceived it more broadly as a basic capacity of human thought that is connected with memory, problem solving, counterfactual reasoning, and other fundamental aspects of cognition.

Imaginary thinking begins early. In fact, some of the most compelling examples are found in pretend play, a widespread activity in human children that is almost entirely absent in other species. Children start to pretend in the second year of life, about the same time that they begin to talk. The first acts of pretense are simple; the toddler raises an empty cup to the lips, makes drinking noises, and smiles at the caregiver. By the time children are 5 or 6 years old, they are capable of engaging in elaborate social games of pretending, stepping in and out of their roles to give stage directions to the other players and to deal with the interruptions of everyday life. They also use their developing imaginations to entertain themselves when they are alone. For example, it is common for preschool children to invent imaginary companions who serve as a combination of friend, confidant, and scapegoat.

In the past, children's pretend play has not always been viewed in a positive light. In particular, Piaget described early pretending as evidence of immature thought that was not adapted to reality, an activity that would be outgrown with the cognitive advances of middle childhood. More recently, theorists such as Dorothy and Jerome Singer, Inge Bretherton, and Paul Harris have proposed a more positive view linking pretend play with children's understanding of reality, emotional mastery, and adult imagination. In pretend play, children explore emotions in games that are under their control. They learn to make sense of the world by considering alternatives to reality. According to Harris, the capacity to consider what *might* have happened is crucial to causal and moral reasoning.

The findings of correlational research are consistent with this positive view of pretending. Children who participate in elaborate and frequent pretending tend to score higher on tests of language ability, self-control, divergent thinking, perspective taking, and a range of other measures of social and emotional development. When children show significant deficits in pretending, there is cause for concern. For example, a deficit in pretend play is one of the primary symptoms associated with autism. Children with autism might be fascinated with blocks or other toys and spend hours lining them up, but they do not use them as props in games of make-believe in the way that is so common in normally developing children.

Children continue to pretend beyond the preschool years, although these activities tend to be more private (e.g., a teenager who writes to an imaginary companion in her diary or spends hours in role play games on the Internet). More broadly, imaginary thinking continues with an increasing ability to conceptualize nonactual, fictional, and metaphysical possibilities. It is a

uniquely human capacity that develops early and is crucial in everyday thinking throughout life.

—Marjorie Taylor

See also Imaginary Audience, Imaginary Friend

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IMITATION

Anthropological evidence has shown that, in many cultures, observational learning and imitation are the major ways by which behaviors unique to that culture are transmitted from one generation to the next. It has been argued that imitation is more efficient than either trial-and-error learning or individual problem solving. Learning by imitation is much more rapid, particularly when the environment of the demonstrator and the observer are similar, the cost of individual learning is high, and in situations when it is not readily apparent how the demonstrator is solving the problem.

Perspective taking and intentionality may develop as a result of imitation, and imitation deficits may lead to impaired social cognitive development. Children with autism, for example, have imitative deficits and imitate much less frequently than typically developing children. It has been argued that such deficits in imitation production are also linked to subsequent deficits in the development of theory of mind.

Before language, imitation is an important way that adults show and teach the child about how objects work, how to solve problems, and a critical way to communicate with other children. Imitation tasks have, therefore, been used extensively in developmental studies with preverbal infants and young children. Simply put, imitation tasks involve a "monkey see, monkey do" procedure in which an experimenter models a behavior, and the subject is then given the opportunity to reproduce it afterward. Gesture imitation and deferred object imitation have been the focus of most developmental studies.

GESTURE IMITATION

Piaget proposed that facial gesture imitation does not emerge until 8 to 12 months of age because while infants teach themselves vocal gestures and manual gestures through listening to their own voices or by watching their own hand movements, this intramodal matching process is logistically impossible for facial gestures.

Meltzoff and Moore, however, challenged the traditional Piagetian notion and found that significantly more newborn, 1-month-old, and 3-month-old infants than would be expected by chance responded with a gesture matching the adult display as judged by observers blind to the experimental condition. Furthermore, infants were able to imitate a range of behaviors including mouth opening, tongue protrusion, and head movement displays. Even infants less than 72 hours old were able to imitate facial gestures. More recently, it has been shown that 6-week-old infants remember the specific facial gestures modeled by the experimenter after a 24-hour delay.

The neonate is capable of storing representations of absent objects and events at birth, and can recognize the equivalence between their behavior and the behavior of other humans. Such a "starting state nativisim" allows that infant to come into the world with the ability to imitate, and this early ability also allows for intermodal mapping and, from there, inference to others or detection of "like me." To extend this notion, neonatal imitation of facial gestures is an early form of perspective taking, and mutual imitation games give infants practice in social interaction and communication. Adults respond to this early imitation by imitating their infants' behaviors, including object and vocal play and facial gestures. Infants also recognize when they are being imitated.

Neuroscience's recent discovery of the mirror neuron system adds support to the argument that the imitation system is playing a fundamental role in the emergence of social cognition. Mirror neurons map visual information of actions by others onto motor representations in primates including humans. That is, mirror neurons allow imitation to occur by building the motor plan for action at the time of the demonstration.

DEFERRED IMITATION

The ability to reproduce an action that was previously modeled by another individual after a delay is called *deferred imitation*. Deferred imitation was originally described by Piaget from observations of his own children. He described how his daughter (Jacqueline) precisely imitated a peer's temper tantrum that she had seen 24 hours earlier. According to Piaget, Jacqueline watched as a peer tried to get out of his playpen. The boy screamed, moved the playpen backwards, and stamped his feet. The following day when Jacqueline was placed in her playpen, she imitated the same series of actions even though the boy was not there. Deferred imitation has important implications for memory development and learning.

In deferred imitation experiments, target actions involving single or multiple steps are demonstrated by an adult experimenter with an unfamiliar object. Control groups do not see target actions but are often exposed to adult manipulation of the stimuli. Deferred imitation is reported if the imitation score of the demonstration group significantly exceeds that of the control groups.

The age at which deferred imitation emerges has long been debated. Originally, Piaget claimed that deferred imitation did not emerge until infants were 18 to 24 months of age. This finding was challenged when it was demonstrated that 9-month-olds could exhibit deferred imitation. Then neuropsychologists argued that before 9 months of age deferred imitation may not be possible because of the immaturity of the prefrontal cortex or limbic system. Recently, however, studies have demonstrated that even infants as young as 6 months of age exhibit deferred imitation.

Serial learning has also been studied using an imitation procedure in which an experimenter models a specific sequence of actions with a set of props and then children are allowed to imitate the sequence. With increasing age, infants correctly reproduce increasingly longer ordered sequences. Thus, they can correctly reproduce familiar and novel sequences that contain two steps at 11 months, three steps at 13½ months, and eight steps at 30 months of age.

Recall of sequences is consistently influenced by the structure of the target event. Without exception, infants' recall of a series of actions that can only be performed in a specific temporal order ("enabling" or "causal" events such as making a rattle by placing a ball in a container, putting a lid on it, and shaking it) is superior to their recall of actions that can be performed in any order ("arbitrary" events such as dressing a teddy bear by putting on trousers, a scarf, and a cap). The finding occurs even when the enabling and arbitrary events have been matched on the basis of target actions and event goals, and is identical to findings with older children and adults.

Further evidence that toddlers understand the causal nature of the enabling event has been found when irrelevant components have been added to event sequences. The irrelevant components are reliably omitted or displaced to the end of the sequence during reenactment by children between the ages of 19 months and 7 years. That is, imitation is flexible and adaptive; when the sequence requires a specific order, that order is imitated but when the actions are arbitrary order is not imitated.

A somewhat related issue is how an imitation mechanism may interact with other learning mechanisms. If an imitation task, typically remembered for 1 day by 6-month-olds, is associated with an operant task that is remembered for 2 weeks, the imitation task can also be remembered for 2 weeks, and once both tasks are forgotten both equally serve as reminders for the other task. This finding suggests that imitation may be combined with other learning mechanisms to increase retention of otherwise rapidly forgotten information.

Deferred imitation is particularly appealing to study because it is so commonplace in real-world settings. A particularly rich source of imitation is television. Overall, infants imitate fewer behaviors from television than from live demonstrations. When televised demonstrations are repeated, however, even 6-month-olds can imitate simple actions from television. This finding has important applied implications for television programmers. Siblings are another rich source of information for infants and toddlers. Diary studies have shown that infants with older siblings imitated more behaviors without explicit instruction than did infants without siblings, and imitation was characterized by a higher level of pretense and rough and tumble play. Taken together, these studies indicate that imitation is a powerful mechanism by which infants acquire new behaviors in the course of their everyday lives.

CONCLUSION

The range of behaviors that infants imitate after a delay expands with age from facial and body

movements, to actions on and generalization across objects, to intended actions and social goals. By 12 months of age, infants imitate new actions frequently and generalize imitation across different environmental contexts. Cognitive flexibility in imitation continues to increase between 12 and 18 months. Infants can generalize across different objects as well as different environmental contexts. Furthermore, imitation of pretend play emerges between 12 and 18 months. This gradual developmental progression is thought to reflect developmental increases in infants' motor competence and cognitive abilities as well as age changes in their social niche. Cognitive neuroscience is providing exciting insights into the underlying neural correlates that govern imitation production. Studies of deficits in imitation in children with autism indicate the important developmental role that imitation has in social cognition. It is, however, not possible to consider the development of imitation in isolation without considering cognitive development as a whole. The development of imitation is also undoubtedly linked to the development of an increasingly flexible representational system.

—Rachel Barr

See also Bandura, Albert

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IMMIGRANTS

Long-term relocation across national borders represents one of the major ways in which the structure of populations in various countries changes. As a result, immigration remains one of the most important and highly charged sociopolitical issues today. Although everyone is a native of one particular nation, people may sometimes find it necessary to move from their native country to reside permanently in another nation. Thus, entailed in the concept of migration are emigration, moving out of a particular nation, and immigration, settling into the receiving nation.

A 1998 UN report indicates that international migration has risen sharply in recent years. For example, in 2000 alone, the United States accepted

more than 650,000 immigrants. This number does not include individuals who come to the United States illegally. U.S. law defines immigrants as persons lawfully admitted for permanent residence in the United States. Australia also accepted 76,000 immigrants in 2000, while Canada admitted about 196,800 in the same year. The recent increase in international migration could partly be attributed to the ease with which people can now travel from one end of the globe to the other. This is not to suggest that international migration is a recent phenomenon; immigration has been part of human existence since early ages. For example, in the late 1800s and early 1900s, Italian immigrants arrived in the United Sates to look for work, while Russian immigrants came to the United States to escape political persecution. This period also saw the arrival of Jewish immigrants who came to the United States because of the religious freedom the United States offered.

Given the inconvenience involved in relocating to a new country, and the uncertainties people face when they leave their familiar environment, such decisions are not reached casually. Reasons that underlie immigration could broadly be categorized into "push" and "pull" factors. The push factors range from extenuating circumstances, such as being displaced by wars and other natural disasters, and the motivation to escape political or religious persecution, to simple dissatisfaction with one's economic and social life. For instance, the civil wars in Liberia and Rwanda led many people to flee their countries to seek refuge elsewhere. While some of these people might return to their home countries, many others would remain permanently in the nations that granted them asylum. Similarly, lack of jobs and declining economic conditions might make a country less attractive, motivating individuals to emigrate to escape such economic and social hardships.

While these push factors may explain the inclination to move out of one particular country or region of the world, they cannot fully account for the choice of nations in which individuals and their families ultimately settle. Immigration is jointly determined by the push factors, as well as certain pull factors, such as the belief that a particular country offers religious and political freedom, better chances for social and economic advancement, and greater opportunities for fulfillment in all aspects of life. For instance, individuals may be motivated to migrate to a particular country where they believe their skills would be put to maximum use. This is particularly germane to unintended immigration, where some individuals who travel abroad temporarily to study end up staying longer to pursue their careers.

The statutes that govern whom to admit, and on what basis, are typically created at the national level by the individual countries. The process of creating these immigration policies are guided by the interplay of a country's actual experiences with immigrants and the dominant perception among the leaders and citizenry of a nation regarding the desirability and value of immigration. For instance, right after the Canadian confederation, the Canadian government pursued policies aimed at stimulating development in the vast territory of the Canadian West. Immigration was used deliberately as an instrument of industrial development and nation building, and Immigration Acts, such as the Free Grants and Homestead Act of 1868 and the 1925 Railway Agreement Act, were passed to encourage recruitment of workers for the agricultural, railway, mining, and the lumber industries. Although the Canadian government was committed to encouraging immigration, based on public perception, not all prospective immigrants were considered suitable for Canada. Specific immigration policies, such as the Chinese Immigration Act in 1885, were therefore established in an attempt to restrict immigration based on national origin. Immigration was strongly encouraged during periods of economic growth, particularly 1896 to1913 and in the 1920s, and strongly restricted in the 1930s. In particular, British and other Europeans immigrants were encouraged, while non-white arrivals were strongly restricted out of concern for maintaining a particular national identity.

Traditionally, immigration policies of many countries have been guided by four broad objectives: fulfillment of international obligations and humanitarian traditions with respect to refugees, reunification of families that have been separated through migration, fostering of strong and viable economies, and promotion of greater diversity. These objectives are reflected in the designated categories under which people are admitted into many countries as permanent residents. While these broad goals underlie many immigration policies, not all goals are emphasized to the same extent by every country. For example, although the United States admits immigrants in accordance with all four objectives, it particularly emphasizes family reunification. Indeed, 71% of immigrants admitted to the United States in 2000 were family sponsored,

while 21% were economic based. In contrast, Canada puts a high premium on admitting independent immigrants. This class of immigrants is selected, primarily through a point system, on the basis of their potential to contribute to the enrichment of the labor market and stimulate overall economic development of the country. Points are awarded based on personal factors, such as age, education, and language proficiency, and a cut-off point determines eligibility for migration under the independent category. Australia maintains a similar point system for determining admissibility of independent immigrants, and 53% of immigrants admitted in 2000 fell under that category. Countries such as the United Kingdom, Germany, and Sweden also encourage economic immigrants or immigration of individuals who possess special skills.

Migration could potentially facilitate positive change in the social and economic climates of many regions, and, in many instances, is beneficial to the immigrants and members of the giving and receiving nations alike. For many people, migrating to countries such as the United States and other industrialized countries provides economic opportunities, political security, and religious freedom that far exceed those they could possibly experience in their home countries. Immigrants can also enrich the cultures of the host nations by creating diversity of nationalities, traditions, and languages. Indeed, one of the reasons why the United States opens its borders to immigrants from all corners of the universe is to ensure greater diversity of its population than it currently enjoys. To this end, a sizable number of immigrants are admitted into the United States under a diversity lottery system that is aimed at attracting citizens of countries that are underrepresented in the United States. A potential benefit of this cultural diversity is possible elimination of dominant groups, which ultimately could ensure that different racial, religious, and ethnic groups relate to one another on an equal basis. Apart from these sociocultural benefits, immigration can also prove economically beneficial to the host nation and the given nation alike. In fact, many immigrants maintain ties with their families at home, and regular remittances to them have proven to be an important contribution to the gross domestic incomes of some countries, especially among developing nations. Immigrants can also provide special skills that are in short supply in the host nation, such as the current efforts by Germany to attract immigrants with expertise in information technology (IT). This goal of attracting economic and specially trained immigrants underlies the immigration policies of countries such as Canada, Australia, and the United Kingdom.

In spite of the potential benefits of immigration, attitudes toward immigrants and immigration have not always been uniformly positive. In many European countries, for instance, a sizeable number of the citizenry express some concerns about admitting immigrants into their countries. Even members of countries that are historically regarded as nations of immigrants such as Canada and the United States also express misgivings about the continued influx of immigrants. Some survey studies have found, for instance, that only 6% of Americans are favorably disposed toward increasing the current level of immigration in the United States, whereas over 75% would like to see immigration kept below the current levels. The citizenry of Canada, the United Kingdom, and other European and Asian countries would also like to restrict immigration in some way.

Part of the discomfort with immigrants stems from people's perceptions that immigrants threaten their national identities. This threat entails real or perceived differences between members of the host nations and immigrants in terms of values, norms, standards, beliefs, and attitudes. Thus, greater assumed mismatch between the values of members of the host nation and those of immigrants leads to greater perceptions of threat, and, consequently, to less favorable immigration attitudes. Immigrants may also be perceived as posing a realistic threat to members of the host nation. Realistic threat involves perceptions of encroachment upon a group's existence, its political and economic power, and the physical or material well-being of its members. Thus, the perception that immigrants compete for limited resources, such as jobs, education, and housing, has been implicated in unfavorable attitudes toward immigrants and immigration. Perhaps fostering perceptions that immigrants are part of the new home they have found would help improve immigration attitudes, as has been suggested by some research findings.

The challenges involved in international migration notwithstanding, various census data indicate substantial increases in international migration. The pattern of international migration reflects the tendency for the most advanced countries to receive the greatest net change in immigration. The United States has been the largest recipient of immigrants, and this trend is expected to continue into the immediate future,

especially in light of the current U.S. immigration policies that promote family reunification. Many immigrants in the United States would, predictably, sponsor the immigration of their family members, leading to further hikes in the number of immigrants in the United States. A majority of immigrants to the United States since the 1970s have come from the Latin American and Asian countries, especially from Mexico, and this trend is expected to continue. Other countries such as Canada and Australia are also expected to receive immigrants, as are most of the European nations, especially in the advent of the European Union.

—Henry A. Danso

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IMMUNE SYSTEM

The immune system is a defense system that protects invertebrate and vertebrate animals from microorganisms and substances recognized as foreign and potentially harmful. It evolved through a gradual process of increasing diversification that led to the enormous complexity of recognition and elimination mechanisms present in higher vertebrates.

These recognition and elimination mechanisms operate and cooperate within the two components of the immune system—that is, the innate immune system and the adaptive immune system, thus leading to immune responses that protect the body from infectious diseases and cancer. Recognition mechanisms allow the detection of foreign organisms and molecules as well as cancer cells through binding by receptors expressed on the cell surface of certain cells of the immune system.

The specific portion of the foreign invader that is detected by the recognition mechanisms is called antigen. Elimination mechanisms are responsible for the destruction of foreign invaders and cancer through the action of specialized cell types. The complement system, a set of plasma proteins, is also involved in destroying foreign invaders. Innate and adaptive immune responses rely on the activity of white blood cells, or leukocytes. Innate immune responses represent the first line of defenses, exist prior to exposure to a pathogen, are nonspecific, occur in a few hours or days, and involve the participation of two major types of leukocytes—neutrophils and macrophages—which are phagocytic cells able to take up and destroy foreign invaders.

Adaptive immune responses develop several days after encounter with the pathogen, are specific, include the development of immunological memory, and require the participation of two types of lymphocytes: B and T lymphocytes. B lymphocytes produce antibodies, which activate the complement system, neutralize pathogens, or prepare them for uptake and degradation by the phagocytic cells of the innate immune system. T lymphocytes exist in two subsets, helper T lymphocytes and cytotoxic T lymphocytes. Helper T lymphocytes help B lymphocytes and cytotoxic T lymphocytes to become activated for their respective functions.

Cytotoxic T lymphocytes kill cancer cells and infected cells by opening up pores in the surface of these cells and inserting molecules that cause cell death. Adaptive immune responses also require the participation of antigen-presenting cells, which prepare and present the antigen in a form recognizable by T lymphocytes. All cells of the immune system originate in the bone marrow. B and T lymphocytes undergo a maturation process that includes the assembly of their antigen receptors. B lymphocytes mature in the bone marrow, whereas T lymphocytes develop in the

thymus. All cells then migrate to the bloodstream, circulating in the blood and in the lymphatic system, a specialized system of vessels that collects extracellular fluid from the tissues and returns it to the blood.

Adaptive immune responses develop in lymph nodes, which are located at the points of convergence of vessels of the lymphatic system. Although the immune system is generally capable of protecting us from foreign invaders, there are several instances in which it may fail. Immune responses are sometime elicited by antigens not associated with infectious agents and, in conjunction with genetic and environmental factors, may result in serious autoimmune diseases such as multiple sclerosis and systemic lupus erythematosus. Responses to environmental antigens cause allergic diseases and other hypersensitivity reactions. In immunodeficiency diseases, a defective gene causes the elimination of one or more components of the immune system leading, in the most severe cases, to overwhelming infection. The acquired immune deficiency syndrome, or AIDS, is a form of immunodeficiency. It is caused by a virus, the human immunodeficiency virus or HIV, and is characterized by the destruction of several cell types of the immune system, especially helper T lymphocytes.

—Roberta Attanasio

See also Acquired Immune Deficiency Syndrome (AIDS), Sexually Transmitted Diseases (STDs)

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IMMUNIZATIONS

Immunization is a procedure routinely used to improve the body's ability to overcome infection and protect against diseases caused by infectious agents. It works against a specific disease by training the immune system to rapidly recognize and eliminate the infectious agent that causes that disease, thus resulting in immunity. Protection can be acquired either by passive or by active immunization.

Passive immunization involves transfer of antibodies obtained from an immune donor to a nonimmune individual and results in temporary immunity. Currently, antibody-based therapies represent a form of treatment for disorders induced by venoms or toxins and for viral infections. Injections of antibody preparations derived from immunized human donors are used for the prophylaxis and treatment of tetanus, rabies, and pneumonia caused by respiratory syncytial virus (RSV), as well as infections caused by hepatitis A virus, hepatitis B virus, and varicella-zoster virus. Monoclonal antibodies are expected to replace preparations derived from human donors. However, at this time, only one monoclonal antibody has been licensed for an infectious disease (RSV infection).

Active immunization induces an adaptive, long-lasting immune response to a pathogen by introducing the killed or attenuated pathogens or antigens derived from the pathogens into the body. These nonpathogenic forms of the pathogen are the major component of a vaccine. Therefore, active immunization is routinely achieved by administering different types of vaccines. In the past 100 years, the use of vaccines (along with sanitation practices) has dramatically reduced the number of deaths caused by infectious diseases. Administration of vaccines results in the induction of a vigorous immune response, similar to the one that would be induced by natural infection. Vaccine administration may result in antibody responses, cellular responses, or both. A major feature of effective vaccines is the ability to induce memory immunity, which allows the immune system to respond quickly and strongly to infections even several years after immunization. However, in order to maintain sustained, long-term responses, it is necessary to give multiple doses of a vaccine.

Due to the dangers associated with administering a live, infectious agent, attenuated or killed pathogens are routinely used as vaccines. Attenuated pathogens lose their ability to cause disease while maintaining their capacity to transiently grow within the immunized individual. Killed or inactivated vaccines are produced by killing pathogens with chemical or heat treatments. Certain other types of vaccines dispense with the whole organism and use just the important parts that will stimulate an immune response. Such

vaccines are called subunit vaccines and consist of inactivated toxins (toxoids), capsular polysaccharides, or recombinant protein antigens.

In 1798, Edward Jenner developed the first live vaccine for smallpox from the cowpox virus. Jenner observed that a person who contracted cowpox, a much milder disease, would not get smallpox. He inoculated a farm boy with fluid from cowpox lesions of a milkmaid. Six weeks later, Jenner injected the boy with fluid from a smallpox sore. As expected, the boy did not develop the infection. Jenner's discovery established the general principles of safe and effective vaccination and resulted in a sharp decline in the death rate from smallpox in Europe and North America. The use of improved smallpox vaccines eventually led to the eradication of this disease in 1980. However, doses of smallpox vaccine are once again being stockpiled around the world because of concerns related to bioterrorism. Jenner's success with the smallpox vaccine set the foundation for future vaccine development. In 1881, Louis Pasteur developed the first heat-killed anthrax bacilli vaccine. He also proposed that attenuated forms of a virus could be used for immunizations against more virulent forms and developed the rabies vaccine in 1885. Jonas Salk introduced an inactivated vaccine for polio in 1955, which was composed of killed poliovirus. In 1959, Albert Sabin developed an oral polio vaccine from live, weakened strains of the poliovirus. In 1988, the World Health Assembly resolved to eradicate polio by the year 2005. The Global Polio Eradication Initiative is now the largest public health initiative in history. Global immunization rates for the oral polio vaccine peaked in 1990 at 83%. The number of polio cases worldwide has decreased from 350,000 in 1988 to fewer than 800 cases in 2003. Three quarters of all cases globally are now linked to only a few polio "hot spots." Before the measles vaccine was approved in 1963, measles was common in childhood, with more than 90% of infants and children infected by 12 years of age. Since 1997, there have been fewer than 150 measles cases reported annually in the United States. Measles is the only other infectious disease currently targeted for eradication.

Immunization programs in recent decades have achieved genuine success around the world. However, every year, nearly 3 million individuals, including 2 million children, die from diseases that could have been prevented by immunizations. Therefore, increasing attention is paid to childhood immunizations, a series of immunizations given to children to prevent diseases that pose a threat to them. Immunity provided to the newborn by maternal antibodies transferred through the placenta protects against many diseases. However, this immunity generally declines during the first year of life. In addition, the majority of children do not have maternal antibodies against whooping cough, polio, hepatitis B, or infections due to *Hemophilus influenzae* type B, all diseases that can be prevented by currently available vaccines. Thus, immunization programs are started early, with many vaccines given during the first months of life. The recommended immunizations for children and adolescents in the United States. currently include the following vaccines: HepB (hepatitis B), DTaP (diphtheria, tetanus, pertussis), Hib (*Haemophilus Influenzae* type b), IPV (inactivated poliovirus), MMR (measles, mumps, rubella), varicella, PCV (pneumococcal), influenza (for children with certain risk factors) and, in selected populations, hepatitis A.

Despite the successes of immunization programs in most parts of the world, immunization coverage rates haven't reached their potential in some areas. Coverage rates are constantly used as an indicator of the health of a population and refer to the percentage of a defined population protected by immunizations against specific vaccine-preventable diseases. In areas where low coverage rates exist, not enough people get vaccinated, and subsequently the nonimmunized population remains susceptible to disease. Only when sufficient numbers of people are vaccinated is adequate protection of that population achieved. Indeed, when the number of individuals susceptible to a specific infectious disease in a population decreases because of immunization, the natural reservoir of infected individuals present in that population falls, thereby reducing the probability of transmission of infection. This phenomenon, which is called herd immunity, explains why even nonimmunized members in a population can be protected from that specific infectious disease if the majority is immunized.

The coverage rates of the DTP vaccine is a useful indicator of the performance of immunization programs in a country because it is administered on a routine basis as compared to other vaccines. In 1999, the Americas and the Caribbean, the Middle East and North Africa, and East Asia and the Pacific had coverage rates close to 90%, with some regional variations. However, even though global coverage of 72% for routine DTP vaccination was achieved, regions of

sub-Saharan Africa and South Asia fell well below the average. Globally, among vaccine-preventable diseases, measles is responsible for most deaths in children under 5 years of age. While western and central Europe, the Americas, and the Caribbean have achieved coverage of above 90% with the measles vaccine, other regions lag far behind with coverage levels at about 50%.

Political, economic, and social instability have undermined immunization programs in different parts of the world, as seen with declining coverage rates in sub-Saharan Africa and in central and east Europe. Poor health service delivery systems, lack of cold chain equipment, and improper administration have compromised the quality and safety of vaccines in some developing countries. Budgetary constraints, low political commitment, and lack of effective disease surveillance have also limited the effectiveness of immunizations in these areas.

To reduce barriers and increase immunization rates, federally funded public health centers in the United States are required to conduct regular assessment and feedback of vaccination rates. To maintain high vaccine coverage, the Centers for Disease Control and Prevention have developed the Clinic Assessment Software Application (CASA) to assist in measuring vaccination rates. CASA also assists in improving vaccination practices, encouraging parents to initiate the vaccination series on time, and contacting parents when children are due for or have missed vaccinations. The Advisory Committee on Immunization Practices, which periodically reviews the U.S. childhood and immunization schedule, recommends regular feedback about vaccine-delivery practices in order to motivate providers and staff in personal health care services. Around the world, Global Alliance in Vaccines and Immunization is involved in efforts to improve overall public health infrastructures that can monitor disease patterns. These organizations also explore strategies to increase overall financing for immunizations and raise the visibility of immunizations, especially among vulnerable populations. Mass immunization campaigns have historically played an important role in starting new immunization programs in developing countries and in areas with political instability, wars, and epidemics. Therefore, several approaches are being undertaken in the United States and around the world to maintain the remarkable progress of the various immunization programs, which, in general, continue to represent an impressive public health success with benefits extending to future generations.

—Roberta Attanasio and Lakshmi Jayashankar

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IMPRINTING

In contrast to altricial animals, precocial species must be able to walk within a short time after birth. However, this ability may result in wandering away from the safety of the mother. Newly hatched domestic fowl, ducks, geese, quail, ungulates, and guinea pigs are precocial. These young animals are dependent on the mother for food, guidance, and protection. Therefore, they must develop an attachment to the mother to ensure they stay with her to increase the probability of survival. Konrad Lorenz, in the 1930s, coined this attachment behavior as *imprinting*.

Imprinting must occur within a specified time period following birth or hatching. This time period is called the sensitive, or critical, period. In most cases, if the animal does not become imprinted to an object during this critical period, it is highly unlikely that it will develop later. Additionally, Lorenz found that the imprinting affects the future sexual preferences of the animal.

Lorenz examined the imprinting process of young goslings. He found that they imprinted to the first moving object they saw within the first few days of hatching. The moving object could be a ball, a toy soldier, or a person. Lorenz himself became the imprinted object of many Graylag goslings. Other researchers

have found that the imprinted figure could also be the one who provides the first feeding, living figures and individuals, female caregivers, and moving objects, whether living or inanimate. Imprinting, therefore, is the mechanism that evolved to produce following behavior. The adaptive function of imprinting is to allow the young animal to distinguish its own mother from other mothers of the same or different species and to remain near her.

Imprinting facilitates future adult social behavior in addition to feeding, guidance, and protection in infancy. Lorenz suggested that the imprinting provides a model for the individual to compare all members of its species against other species. Japanese quail, for example, have been observed to choose sexual mates that are similar to those individuals they were exposed to during the imprinting stage. Although the mates were similar to the imprinted figure, they were not exactly like them. Lorenz and others speculated that this is a mechanism that evolved to reduce the probability of inbreeding. Specifically, in their natural environment, young animals imprint on immediate relatives, typically their mothers. By choosing mates that are somewhat similar to the imprinted figure, the animal is increasing the chance that the mate is unrelated.

Lorenz also believed that imprinting was enhanced by its consequences. When a young chick, duckling, or gosling imprints to its mother, she will provide positive rewards for this behavior. Specifically, she will scratch the dirt for food, guide the young to appropriate shelter, and provide protection from predators. Additionally, laboratory studies have shown that rewarding young birds with food enhances their imprinting behavior. However, food is not the only reward that influences imprinting behavior. Studies have shown that young animals tend to avoid novel objects and exhibit fear responses when around them. Imprinting provides the young animals with a familiar object to approach. The familiar object symbolizes safety and comforting thus reducing anxiety. This reduction of anxiety may be an additional reinforcement for imprinting behavior.

Finally, Lorenz suggested that imprinting is an innate behavior that is genetically programmed to occur when activated by a releaser mechanism. Nikolaas Tinbergen, a colleague who worked closely with Lorenz, suggested that sign stimuli are environmental cues that elicit certain behaviors. In the instance of imprinting, the sign stimuli serve as the releaser mechanism that promotes parental proximity-seeking behavior by newly hatched or born animals.

—Sherril M. Stone

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INBORN ERRORS OF METABOLISM

Inborn errors of metabolism (IEMs) are single-gene disorders that block a normal metabolic process and produce a nonmetabolized substance that often has serious, in some cases fatal, consequences. Each of the over 300 known IEMs is of low prevalence in the population at large, ranging from 1/10,000 to perhaps 1/350,000 births, but in combination affect about 1 in every 2,500 to 5,000 births. Additionally, a few are far more prevalent in some groups than others. Tay-Sachs, for example, although generally rare, occurs in about 1/3,500 Ashkenazi Jews. In most cases, effects do not begin until some time after birth when the newborn begins to eat and metabolize its own food.

Most IEMs are autosomal recessive, and are manifested equally in males and females who have inherited a mutant recessive gene from each parent. A few, Lesch-Nyhan for example, are X-linked and manifested largely or solely in males.

ONSET AND DEVELOPMENTAL PROGRESSION

IEMs may present at any time during life with a variety of symptoms and rate of progression, making

some diagnoses difficult. Most affected individuals appear normal at birth, although some disorders have facial and other physical characteristics. Batshaw and Tuchman describe three types in terms of their first appearance: (1) Silent disorders (e.g., phenylketonuria and congenital hypothyroidism) are not apparent until severe developmental delay and mental retardation occur in infancy or childhood unless they have been identified in newborn testing. (2) Disorders (e.g., urea cycle disorder and organic acidemias) presenting, at about 3 days of age, acute metabolic crisis and severe symptoms, including vomiting, respiratory distress, abnormal odor, and lethargy followed by coma. These symptoms also characterize other newborn disorders, complicating diagnosis. Death generally follows in the absence of accurate diagnosis and acute medical intervention. (3) Disorders with progressive neurological deterioration (e.g., lycosomal storage disorders, including Tay-Sachs, Hurler, and metachromatic leukodystrophy) show apparently normal development for some period followed by loss of motor and cognitive skills, general nonresponsiveness, and death in infancy or early childhood.

CATEGORIES

Categorical systems are based on the type of metabolic error, but no one system has been adopted. The following is taken from Weiner with examples from various sources.

1. Disorders of protein metabolism (e.g., amino acidopathies, including PKU and maple syrup urine syndrome)
2. Disorders of carbohydrate metabolism (e.g., galactosemia)
3. Lysosomal storage disorders (e.g., mucopolysaccharidoses [MPS], Tay-Sachs)
4. Fatty acid oxidation defects (e.g., medium chain acyl-CoA dehydrogenase deficiency [MCAD])
5. Mitochondrial disorders (e.g., mtDNA depletion syndromes)
6. Peroxisomal disorders (e.g., Zellweger syndrome)

DIAGNOSIS

As Kelley suggests, pediatricians routinely see infants and young children with developmental delay or mental retardation, but no clear sign of an IEM. Specific IEM diagnosis is generally through blood or urine test, but many can be identified prenatally through specific amniocentesis or chorionic villus sampling assay. Some signs in the newborn period, as indicated above, are highly suggestive of an IEM. According to Weiner, the following are potential signs of an IEM: any severe illness in a newborn; unexplained death of a sibling; otherwise undiagnosed developmental delay or motor and/or cognitive deterioration; onset of symptoms in reaction to change in diet or unusual dietary preferences; apparent toxic reactions to certain foods, particularly proteins or carbohydrates; and exaggerated symptoms from routine infections.

Several IEMs can be identified through routine neonatal screening. Although virtually all hospitals now screen for PKU, screening for other IEMs varies widely.

TREATMENT AND OUTCOME

Several forms of treatment are effective in at least partially reducing the impact of a variety of IEMs, particularly those that can be identified in neonatal screening. Batshaw and Tuchman describe the following approaches: (1) limit intake of toxic substance through its elimination from the diet or a specially designed diet; (2) provide deficient enzyme to enable normal metabolism; (3) stimulate a detour around the metabolic block through medication; (4) provide a vitamin co-factor to increase deficient enzyme action; (5) provide synthetic enzyme replacement; (6) transplant a normal organ to supply needed enzyme; (7) employ gene therapy.

Outcome of treatment varies widely from prevention of most adverse effects of some IEMs (e.g., PKU and galactosemia) to those where no treatment is available and the disease's progression is unavoidable. Overall, treatment for about half of known IEMs increases affected individuals' longevity, growth, cognitive functioning, and other functions. In many cases, treatment will be lifelong.

—Robert T. Brown

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INCEST

The legal definition of incest varies from state to state, but most often includes a prohibition of sexual contact between persons who are related by blood and/or social ties. Most states consider that minor children cannot give consent before a defined age and therefore child/adult incest is a criminal act, whether or not there is coercion or violence involved. Some theorists and researchers have broadened the term to include any sexual betrayal of a relationship of trust between a child and an adult. This definition emphasizes the psychological trauma that occurs with childhood sexual abuse.

Accurate prevalence statistics are difficult to obtain. Most researchers agree that between 20% and 25% of girls and about 2% to 16% of boys will be sexually abused by the age of 18. Men account for 90% to 95% of perpetration for both girls and boys, most often in the father role, although perpetration by women is most likely underreported. Incest typically begins when a child is between the ages of 8 and 12, lasts an average of 4 years, and averages 20 incidents over that time frame. Although stereotypes abound, incest crosses all ethnic groups, socioeconomic statuses, and is no more likely in rural areas than in urban ones.

Generally, greater psychological trauma is associated with a younger age of onset, a closer relationship between the child and the perpetrator, and a longer duration or greater frequency of incidences. Psychological effects on the victim are often tied to the developmental age of the child when the incest occurred. The idiosyncratic meaning of experience greatly influences the amount and type of trauma experienced. Initially, the reaction to the outcry is influential regarding recovery: if the child is believed by the adults they tell, blame is placed with the perpetrator, and support is given, there is a good prognosis for healing. If the child is not believed, or is blamed for the abuse, more psychological distress is usually encountered.

Adults who, as children, experienced no intervention or poor intervention often experience a range of psychological problems due to the incest. The most common psychological effect for victim/survivors is pervasive self-blame. Posttraumatic stress disorder, characterized by hypervigilence and anxiety, avoidance of cues that remind them of the abuse, and intrusive thoughts about the abuse, is often observed with victims of incest. Adult survivors of childhood sexual abuse can also experience depression, suicidal ideation/attempts, and substance abuse. Sexual functioning can be disturbed, from lack of sexual desire to indiscriminate sexual behaviors. Relationships are affected, as many victim/survivors note that they have difficulties with trusting. Victims often use dissociation to cope with difficulties throughout their lives, because it was a likely adaptive skill during the actual abuse. Somatization is a common occurrence, with stress-related medical problems such as TMJ and reproductive illnesses. Incest victims often report repeated revictimization throughout their lives, including other forms of interpersonal violence, such as battering and rape in adulthood, as well as increased frequency of victimization in other violent crimes. Importantly, the above psychological reactions should be regarded as ways to cope as a child with a very intrusive and overwhelming experience that may or may not be adaptive into adulthood.

Few criminal charges are filed when the incest occurs. As adults, victims are winning increasing numbers of civil cases, and the statute of limitations is being extended in many states from time of first outcry. Unfortunately, for more perpetrators there is little chance of being caught or prosecuted. Most will abuse several children during their lifetimes.

—Susan C. Turell

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INCLUSION/MAINSTREAMING

INCLUSION OF CHILDREN WITH DISABILITIES IN REGULAR CLASSROOM SETTINGS

Over the last 30 years, there has been a steady shift toward greater inclusion of children with disabilities in regular classroom settings. Inclusive education means that children with and without disabilities are educated together in integrated classrooms. In inclusive settings, all children and their parents have an equal opportunity to interact with the larger school community. Inclusion is not the same as mainstreaming. Mainstreaming includes children with disabilities in the general classroom only part-time. Where mainstreaming occurs, children with disabilities receive the majority of their education in segregated classrooms with other children who have disabilities. The opportunity to interact with typically achieving peers is limited, and children who are mainstreamed are less likely to feel like they belong to the larger school community and are less likely to be accepted by their peers.

Children with special needs who are educated in inclusive schools are provided with individually tailored support and instruction so that their specific psychoeducational needs are met. Many children with disabilities require accommodations to profit from the general education curriculum. In inclusive schools, accommodations and adaptations are provided within the setting of the regular education classroom. Accommodations may be made with respect to methods and materials (e.g., hard copies of notes and breaking lessons into smaller segments), assignments and assessments (e.g., modified assignments and extra time to complete work), or the learning environment (e.g., preferential seating and small group instruction).

Classrooms around the country have become more inclusive over the years. According to the U.S. Department of Education, from 1998 to 1999, 47% of students with disabilities in the United States spent over 80% of the day in a regular education classroom. Increasingly, general education teachers have had to learn how to address the different educational needs of students with and without disabilities who are included in their classrooms. Indeed, approximately 96% of general education teachers have at some point taught a student with a disability. There are approximately 5.8 million children with disabilities in the United States. Widespread efforts to promote positive attitudes toward disability and to train school personnel are necessary to break down some of the educational barriers to inclusion. Knowledge about the characteristics of various disabilities and the ability to adapt one's teaching to meet the needs of children with disabilities in the general education classroom are now essential responsibilities of general education teachers. Unfortunately, most teachers report that their preservice training did not adequately prepare them to meet the educational needs of students with various disabilities.

Children with disabilities and their parents have been given equal and fair access to education ever since the inception of the Individuals with Disabilities Education Act (IDEA). IDEA became law in 1975 and was updated in 1997 and again most recently in 2004. The Amendments of 1997 gave children with disabilities and their parents unprecedented rights. Under the law, children with disabilities and their parents are actively encouraged to participate in their education. And, although schools are not required by law to practice inclusion, schools are required to make every effort to include all children in general education programs and settings. Indeed, the language in the IDEA Amendments underscored that all children and youth with disabilities shall have access to a free, appropriate public education with nondisabled peers to the maximum extent appropriate and may be included in any state or district-wide accountability programs. Accordingly, U.S. schools have been increasingly educating students with disabilities in regular classrooms.

Prior to the IDEA, children with disabilities were segregated and taught in separate classrooms. Unfortunately, research suggests that children with disabilities frequently experience isolation, peer rejection, and loneliness, and also tend to suffer chronic depression and anxiety more often than children who do not have disabilities. Negative and prejudiced attitudes toward peers with disabilities are evident as early as the preschool years and may persist through high school. Indeed, school segregation of children with disabilities contributed to their poor experiences in school and to the negative attitudes held by other children and adults. In the 1980s, mainstreaming—pulling children with disabilities out of their regular classrooms for special help with resource teachers—was

especially commonplace. While mainstreaming was an effort at eliminating school segregation of children with disabilities, it was not enough. Today, children who are educated in inclusive settings are not in isolated classrooms and they are not pulled out of the general classroom for special assistance; instead, they receive all the help they need in their general education classroom. Today, even children with the most severe disabilities (e.g., Down syndrome, autism) are included in general education classrooms for at least some portion of the school day.

Nevertheless, critics of full inclusion argue that placing children with disabilities in the general classroom taxes the already overworked general education teacher. Some general education teachers echo this criticism, believing that inclusion results in a heavier and more challenging workload. Other critics worry that the inclusion of children with disabilities in the general classroom results in a lowering of curriculum standards for the typically achieving children. In contrast, proponents of inclusion argue that segregating children with disabilities is a violation of their human rights. They further contend that all people regardless of whether they have a disability have a role to play in society. Advocates of inclusion argue that integrated schools prepare children for an integrated life beyond school. Indeed, recent scientific studies are encouraging and point to positive social and academic outcomes for children who are educated with typically achieving peers in inclusive settings. Without a doubt, with appropriate support and continuing intervention efforts, all children can experience success in school and beyond.

—Rebecca S. Martínez and Amy C. Dick

See also Individualized Education Programs (IEP), Individuals with Disabilities Education Act (IDEA), School

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INCONTINENCE

Urinary incontinence is a condition that occurs when there is involuntary loss of urine from the bladder. It is estimated that more than 17 million Americans are affected, women more commonly than men (38% versus 19%). Costs related to medical care, sanitary products, and pharmaceutical agents top $28 billion per year.

Urinary incontinence occurs across the life span; it encompasses bedwetting in older children, urine loss after childbirth, postmenopausal leakage, middle-aged prostate complications, and a variety of situations in the elderly.

There has been considerable medical research relating to the management of urinary incontinence. Newly developed medications (with few side effects), behavioral interventions (such as muscle training, electrical stimulation, and biofeedback exercises), vaginal pessary use, and surgery to lift and reposition the bladder can successfully help 8 out of 10 people suffering with urinary incontinence.

Urinary incontinence occurs when the lower urinary tract, composed of the bladder, prostate gland in men, urethra, internal and external sphincters, and

uretheral meatus malfunction. Normally the bladder, a hollow organ that expands to store urine from the kidneys, receives sensory signals that direct its detrussor muscle to fill and empty. Although the usual capacity of the bladder is about the size of a large orange, when the bladder is half full the first sensation to urinate should occur. The desire to void is voluntary. This allows the bladder to contract while the urethral sphincters relax, so that urine passes freely. When standing, men voluntarily contract abdominal muscles to aid in emptying. Women sit or squat to empty, thus compressing their abdomens by positioning.

Urinary incontinence can be acute or chronic. Different causes create these conditions. Acute (transient) urinary incontinence is usually associated with illness or a specific medical problem. Dehydration, restricted mobility, vaginitis, bladder infection, severe constipation, and side effects of high blood pressure medications are common examples. For those people taking multiple medications on a daily basis, urinary incontinence can occur because of drug interactions. Urinary incontinence is usually transient in those with high fever or delirium.

Chronic conditions affect the majority of people experiencing urinary incontinence. Dysfunction in the bladder can cause overactivity and hypersensitivity or distention. Obstruction from an enlarged prostate or narrowing and poor urethral tone can lead to urethral or sphincter dysfunction, resulting in incontinence.

Stress urinary incontinence commonly occurs when the urethra or sphincter are weakened. Activities that change the interabdominal pressure, such as coughing, sneezing, laughing, lifting heavy objects, performing aerobic exercise, and changing positions from supine to upright, are associated with urine leakage when the urethra and/or sphincter are weakened. Amounts of leakage can range from a few drops to complete soaking of clothing. Obesity, recent childbearing, birth trauma, having multiple pregnancies, and experiencing menopause can increase urinary incontinence in women. In men, prostate surgery and radiation to the bladder or prostate can contribute to stress urinary incontinence. Pelvic muscle strengthening exercises, called Kegels, have been shown to be 75% effective in reducing symptoms by half for mild to moderate cases. Vaginal weights and pessaries (a mechanical device to hold muscles in place) can be used for mild to severe cases. If fitted correctly, pessaries can be 100% successful in maintaining continence. In women, estrogen supplementation by mouth, patch, or direct application has demonstrated improvement in. In men, Kegel exercises (75%), biofeedback techniques (66%), and electric muscle stimulators (62%) can offer relief. For moderate to severe leakage, gynecologic surgery to resuspend the bladder is successful in most cases.

Urge urinary incontinence (also called overactive bladder) is caused by confused neurological pathway signals. Urge incontinence occurs while the bladder is filling when the detrussor muscle involuntarily contracts and pushes the urine out the urethra. Once the bladder starts emptying, it cannot be voluntarily stopped. Often large amounts of urine are leaked. Symptoms of urge incontinence include sudden urge to void, greater than eight voids per day, and three to four nocturnal voidings. People report common triggers such as running water, dish washing, cold exposure, anxiety, caffeine consumption, and immersion of an extremity in water. Conditions that commonly occur with urge incontinence are stroke, spinal problems, multiple sclerosis, diabetes, and bladder tumors. Most elderly people suffering from incontinence have this type. People with urge incontinence frequently perform "toilet mapping." "Toilet mapping" involves identifying areas with toilets at malls, or locations with toilets when traveling. Behavioral therapies to assist with urge incontinence focus on timed bladder emptying. Toileting training has been successful with 25% to 40% of elderly people with incontinence. Anticholinergic medications (Detrol and Ditropan are most commonly prescribed) are very effective in decreasing urgency and frequency and stabilizing signals to the bladder. Studies have shown that 43% to 67% of people taking anticholinergic medications became continent and another 50% had reduced symptoms in 61% to 86% of cases. These medications can be used long-term. Electrical stimulation can improve symptoms in 50% to 60% of cases. Penile clamps, placed half way down the shaft of the penis, can be 100% effective in controlling urge incontinence following cancer surgery in men. Care must be used to avoid injury to the penis. Combination anticholinergic medications with behavioral treatments have demonstrated an 88% continence rate. Surgery cannot help remedy this type of incontinence.

—Barbara Camune

See also Prostate Cancer

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INDEPENDENT LIVING

The independent living movement was born in the mid- to late 1960s along with several other civil rights groups, such as African Americans and women, who became activists for equality in American society. Before this time, many people with disabilities lived either with their parents or sadly, in nursing homes or other institutions, because they did not have access to community-based services to facilitate their independence. These limited options were eventually expanded, and the idea that one could have a severe disability and still live independently in the community was promoted by Ed Roberts, also known as the "father of independent living." Roberts' story is a heralded one in the brief history of independent living. As a child, he developed polio at age 14, leaving him a quadriplegic, reliant on a large piece of equipment called an "iron lung" to breathe. He lived in a nursing home for many years. Roberts fought many battles with vocational rehabilitation and the University of California, Berkeley, to gain their support in his quest for higher education (Levy, 1988). Upon acceptance to UC Berkeley, Roberts needed a place to live on campus. He was able to secure part of a university hospital unit and gain the assistance of others to get him up in the morning, ready for classes, and put him to bed again in the evening. The need for these and other services by many people with severe disabilities eventually led to the development of the first Center for Independent Living (CIL) in Berkeley around 1974. The mission of the CIL was not just to provide services to people with disabilities, but also to stress the importance of civil rights to ensure their full participation in the community like nondisabled peers.

In the early 1980s, the U.S. Rehabilitation Services Administration initiated a grant competition to establish funding for 10 CILs. These nonprofit organizations were to serve as community disability resource centers to provide independence-promoting services based on a peer support model and raise awareness of disability issues in the community. As of 2005, this consumer-directed network of resource centers has expanded to include 390 CILs, each with its own board of directors. These centers sponsor more than 300 branches and satellite offices in communities across the nation (Enders, n.d.).

PHILOSOPHY

What makes CILs unique from other nonprofit human or medical service organizations? The composition of CILs differs as funding regulations require that over 51% of staff and governing board members must be people with disabilities. In contrast to other disability-specific organizations such as the Association for Retarded Citizens (ARC) or the National Federation of the Blind (NFB), CILs serve people *across all disabilities*. CILs refer to their constituency as "consumers." In contrast, vocational rehabilitation

Table 1 Comparison of the Rehabilitation and Independent Living Paradigms

Issue	*Rehabilitation Paradigm (Abling Model)*	*Independent Living Paradigm (Enabling Model)*
The problem defined	Disability or impairment Lack of vocational skills	Lack of autonomy Dependence on professionals
Problem focus	On the individual	In the environment In the rehab process
Problem solution	Intervention by professionals	Peer counseling Advocacy Self-help Consumer control Barriers removal
Social role	Seen as patient or client	Seen as consumer
Who is in control?	Professionals	Consumer
Desired outcomes	Restore maximum function Obtain gainful employment	Living independently in the least restricted environment

agencies use the term "client." The term "consumer" was selected to emphasize the importance of choice for people with disabilities in deciding what services best fit their unique needs as individuals, in contrast to a "one size fits all" service model. DeJong (1979) contrasts the paradigms of the medical model and the independent living model of service provision. For a more detailed comparison, see Table 1. The IL model stresses that consumers are experts on their needs, rather than being viewed as having a problem that needs to be fixed or rehabilitated. It also emphasizes that any problem typically resides in the environment, and that when modified can allow consumers to more fully participate. Thus, rehabilitating a person without giving consideration to how the environment could accommodate the person's functional limitations would be short-sighted. The latter approach demedicalizes the disability and focuses on environmental change to accommodate the person's needs. It underscores the importance of the Americans with Disabilities Act (ADA), which prohibits discriminatory programs, practices, and policies against people with disabilities.

INDEPENDENT LIVING CORE SERVICES

Federally funded CILs are required to deliver four core services. These include: information and referral, advocacy, independent living skills training, and peer counseling. Currently, there is consideration of a fifth core service—assisting people with disabilities living in institutions to relocate to community settings. These core services are supplemented by other services such as housing assistance, transportation, and advocacy, which is considered the most important service to facilitate independent living.

THE FUTURE OF INDEPENDENT LIVING

Currently, CILs are fighting for restoration of parts of the ADA that have been weakened by the federal courts. Centers are also mobilizing for passage of Medicaid Community-Based Attendant Services and Supports Act of 2003 (MiCASSA) (S 971 and HR 2032) to move people with disabilities living in institutions to community-based settings.

—Glen White

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INDIVIDUAL DIFFERENCES

Human variation in psychological, physical, and behavioral characteristics is both an obvious and

inescapable reality. Recognition of this universal phenomenon likely arose in step with the rise of human civilization. Formal philosophical treatment of individual differences in intellect, integrity, and motivation, for example, can easily be traced back at least to Plato, and evidence indicates that testing for such differences was practiced by the Ming dynasty in ancient China. The scientific study of *how* and *why* people differ in systematic ways is known as the psychology of individual differences. The psychology of individual differences seeks to understand how inter- and intra-individual differences in psychological characteristics interact with environmental affordances and demands to produce differences in a variety of personal, work, educational, and social outcomes. The theories and psychometric methods developed by individual difference researchers are used by social scientists to understand, critique, and address practical problems in a variety of contexts such as education, selection, evaluation, and guidance.

CORE DOMAINS: INTELLECTUAL, PERSONALITY, AND CONATIVE

Individual differences have traditionally been studied as three broad domains: intellectual, personality, and conative. It is important to note that, although these are often treated as separate aspects for the purpose of investigation, they are intertwined to some degree.

Intellectual Differences

Arguably, no area of psychological study has been more closely scrutinized than the science of mental abilities. Since its beginnings in the late 19th century, the scientific study of intellectual differences has amassed a wealth of empirical data that unarguably supports two conclusions. First, what people typically think of as "intelligence" is best described by a hierarchal model with numerous specific abilities occupying the lower levels, a small number of group factors at an intermediate level, and a single general cognitive ability factor, referred to as "*g*," at the top. That is, although specific mental abilities (e.g., verbal ability, quantitative ability, visual-spatial ability, short-term memory) can be identified, people who are high (or low) on any individual specific ability tend to be relatively high (or low) on the others. Second, although the assessment of intra-individual differences in specific abilities may be especially useful in personnel classification, and academic and career counseling, it is the *g* factor that accounts for most of the variance in important academic, occupational, and social outcomes attributable to mental abilities. The *g* factor is formally defined as the "eduction of relations and correlations," that is, the ability to infer or deduce meaningful principles and concepts from abstractness and novel situations.

Unfortunately, a number of misconceptions continue to plague the interpretation of this research. For example, although the popular media (and an occasional scientist) use the term "IQ" as a synonym for intelligence or cognitive ability, it is important to recognize that IQ is a score from a specific test, not a characteristic of a person. Just as the number associated with a given temperature will change if one switches from a Celsius thermometer to a Fahrenheit thermometer, a person's IQ score may change if assessed with two different IQ tests. Nothing has changed about the person, but rather the scale used to generate the number has changed. IQ scores do tend be very useful, though, because they tend to reflect *g* to a large extent, as well as other factors. A similar misunderstanding arises from how IQ tests are scored. Individual differences in IQ tend to be stable across a person's development because IQ tests are age-normed (i.e., scored relative to the typical level of development for that age group). Obviously, a person's actual intellectual capabilities change over time; however, IQ tests are usually not designed to show this *within-person* development, but rather to assess the relative level of developed cognitive characteristics for a given stage of development. This is why IQ scores tend to appear stable despite notable changes in the population mean level of actual capacities across time. Another misconception is that, because the nature of human mental abilities is known and can be reliably measured, the source of individual differences in them is well-understood. This is not the case. Rather, an enormous amount remains to be understood about the nature of mental abilities, their development across the life span, and the specific genetic, biological, and environmental factors that either hinder or spur their development.

Personality Differences

Personality is of interest to numerous disciplines, including the science of individual differences, which has given rise to a variety of theories. Despite their dissimilarities, most theories typically view personality

as dispositional tendencies, or "a prepardedness," to exhibit certain behavioral reactions to certain environmental affordances and demands. Within the individual difference tradition, most research has followed the "lexical approach" suggested by Galton. This approach assumes that important dimensions of human behavioral tendencies will be encoded in natural language. Using this approach to identify personality characteristics has led to a model of personality commonly referred to as the Big Five. The exact labels used to describe the dimensions have varied, but generally include (1) extraversion (includes surgency and positive emotionality factors), (2) neuroticism (includes anxiety and negative emotionality factors); (3) agreeableness, (4) conscientiousness, and (5) openness to experience. Though there is not a consensus regarding the appropriateness of this model, it is arguably the dominant model in individual difference research, and alternative models tend to be variations with two or more of the factors combined into broader factors or, alternatively, split into more narrow factors.

The use of personality tests for applied practices such as employee selection has had a long and rather tumultuous history. After a period of widespread use beginning in the early 1900s, industrial psychology placed a virtual moratorium on personality testing in the mid-1960s, primarily as a result of a failure to identify a clear pattern of criterion-related validity evidence. Applied personality testing was given new life in the mid-1980s, fueled by the emergence of the Big Five model and subsequent meta-analytic findings of meaningful, though moderate, criterion-related validities for some of these personality dimensions.

Conative Differences

The importance of conative factors (or volition; e.g., interests and motives) is found in virtually all theories of the determinants of purposeful behavior. For example, John Campbell noted that one of the three major determinants of work performance, in addition to declarative knowledge and procedural skills, was motivation. Similarly, Richard Snow has long held that conative (as well as affective) factors are a critical component in the development of aptitudes, a contention supported by substantial research showing that interests, for example, are related to the acquisition of domain-specific knowledge and academic achievement. Likewise, vocational psychologists have long studied differences in interests to forecast vocational adjustment. For example, a widely used model of interest types developed by John Holland, known as the RIASEC model (which is an acronym based on names of the six interest types), has proven an effective framework for studying the impact of person-environment fit on developmental, educational, and occupational outcomes.

Some individual difference scholars have begun using the term "affcon" to refer to this third domain, making salient the potential importance of affect (e.g., emotion, mood, and temperament) in conation. However, some researchers argue that so-called "affcon" factors, or at least the affective component, are actually part of personality. For example, some temperament theorists are emphasizing the role of early appearing differences in temperament as the basis for the development of the Big Five traits. Likewise, some personality researchers have shown evidence for trait-based motivational differences. Although such debate may initially seem to reflect confusion, it also appears to demonstrate the increasing effort to study the development of individual differences as constellations, rather than independent domains.

THE DEVELOPMENT OF INDIVIDUAL DIFFERENCES: NATURE OR NURTURE?

Discussions of individual and group differences too often embrace a false dichotomy. The infamous "nature versus nurture" debate, though once central to the discourse of individual differences, is no longer a credible question asked by informed scientists. Differences in human characteristics are the result of a longitudinal interaction between genetic, biological, and environmental factors. To take a nonhuman example, the color of the hydrangea blossom will vary depending on the acidity of the soil during a certain period in its growth. Thus, the color of its blossom cannot be attributed solely to genetic or environmental factors; the color of the blossom is due to both genetic and environmental factors and the interaction between them. Likewise, to understand how human differences develop, it is necessary to understand (a) how differences in "nature" (i.e., genotypic differences) nurture environmental differences, and (b) how environmental differences (e.g., social, cultural, biological) nurture the expression of genotypic differences.

In addition to genetic–environment (g-e) interactions (e.g., differential reactivity to a given environment), that genetic and environmental factors have a symbiotic relationship is also made salient by the observation of three types of genotype-environment covariance. First, *passive* g-e covariance is reflected by circumstances where biological parents provide both the genetic code and the environment for a child. For example, parents who have high verbal abilities and like to read pass on both a genotype conducive to the development of verbal abilities and interest in reading, and a home environment filled with books and role models who read and express joy in reading. Second, *evocative* g-e covariance occurs because individual differences evoke different responses from the environment, and thus differences in experiences. For example, cooperative, bright students are more likely to receive positive responses from instructors than students who are argumentative and slow. Although a group of students is exposed to the same objective environment, differences in the experienced environment are evoked by manifest trait differences. Third, g-e covariance occurs because people *actively* select, attend to, and seek out specific opportunities and information from the myriad choices provided (often referred to as "niche-picking" or "niche-building"). To the degree that full and unimpeded access to a wide range of environments is available to all members of a group, genotypic and environmental differences are likely to become increasingly correlated as individuals seek out experiences that afford pleasantness (such as success and excitement) and withdraw from or avoid experiences that result in frustration, confusion, boredom, or consistent failure.

SUMMARY

The Declaration of Independence proclaims, "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their creator with certain unalienable rights, that among these are life, liberty, and the pursuit of happiness." When Jefferson penned this phrase, he was neither denying nor ignorant of the omnipresent impact of human variability. Rather, his intent was to suggest the opposite; that is, despite undeniable individual differences, all humans should have equal rights and opportunities. "Created equal" means equality before the law, a concept that has found expression in parts of the U.S. Constitution, and has been given operational force in both legislation and judicial opinion. The study of individual differences embraces this philosophy by seeking to understand how and why humans differ from each other so that we can ensure each individual has an *equal opportunity* for optimal development.

—Charlie L. Reeve

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INDIVIDUALIZED EDUCATION PROGRAMS (IEP)

Special education has been through many stages of reform. By the 1970s, the need for safeguarding students with disabilities from erroneous or permanent special education placements gave way to the development of service contracts–individualized education programs. These documents, or IEPs, gave families protection from schools and made educators accountable for the services they offer children with disabilities. Today, IEPs continue to serve this purpose

and guide special education services aiming to meet students' individual needs.

WHAT ARE INDIVIDUALIZED EDUCATION PROGRAMS?

Special education services are offered to qualifying children with disabilities ranging from ages birth to 21. When a child turns 3 years old, an IEP is developed as specified in Part B of the Individuals with Disabilities Education Act (IDEA). The IEP is a written plan that details the special education and related services the child receives and the supplementary aids provided for the child. The key to IEP development is individualization.

The IEP Team

The IEP is developed collaboratively by the student's parents, the student (when appropriate), a regular and a special education teacher, a local education agency representative (usually the principal), an interpreter of evaluation results, and other persons invited by the school or family.

Elements of the IEP

IDEA specifies several key requirements for IEPs. First, the IEP contains information regarding the student's present levels of educational performance, including how the student's disability affects involvement and progress in the general curriculum. Next, measurable annual goals and short-term objectives are developed to meet the child's unique needs for participating in the general curriculum. Although children with disabilities do not always participate in the general curriculum, it is viewed as the ultimate goal.

Another element incorporated in the IEP is the services including special education and related services, supplementary aids, and program modifications or supports. Importantly noted, school personnel are provided the program modifications or supports, which enable them to assist the student in attaining goals, participating and progressing in the general curriculum, and learning with children without disabilities. A statement of the extent to which the student *will not* participate with students without disabilities in general education classes must also be incorporated within the IEP. Of further issue, the IEP must address the student's participation or lack of participation in state- or district-wide assessments and identify the modifications the student will need for such assessments.

For adolescents, there is an additional element to the IEP—a transition plan. Beginning at age 14, a statement detailing the student's needs related to transition services is included. Beginning at age 16, the IEP describes all needed transition services that the student will receive, including interagency responsibilities and linkages as needed. Transition services are those services that promote the student's movement to postschool activities, such as employment, postsecondary education or training, independent living, and community integration. In addition, as the student reaches the age of majority, all rights transfer from the parents to the student. Parents and the student must be notified of these upcoming changes at least a year prior to this shift.

For services identified in the IEP, a timeline should be defined that includes the anticipated frequency, location, and duration of each. A statement of how students progress toward annual goals will be measured and how parents are informed of such progress should be included. The parents should be informed at least as often as parents of students without disabilities are informed of their children's progress.

IEPs are to be periodically reviewed. This review, which occurs not less than annually, takes place to determine if the annual goals for the student are being achieved. The IEP may also be revised based on several issues: (1) lack of progress toward goals and in the general curriculum; (2) reevaluation results; (3) information presented to or by the parents; (4) student's anticipated needs; and (5) other matters related to the student's education.

SUMMARY

IEPs provide the blueprint for educational planning for students with disabilities. Their development should aim to create the best possible special educational programming for these students.

—Cynthia R. Chambers

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INDIVIDUALS WITH DISABILITIES EDUCATION ACT (IDEA)

The Individuals with Disabilities Education Act (IDEA) of 1997 is the latest reauthorization of the Education for All Handicapped Children Act of 1975. This federal legislation provides the structure and funding for the provision of special education and related services to over 6.2 million children with identified educational disabilities between the ages of 3 and 21 years. Educational disabilities include autism, behavior disorder, deaf-blindness, developmental delay, hearing impairment, mental retardation, multiple disabilities, orthopedic impairment, other health impairment, specific learning disability, speech/language impairment, traumatic brain injury, and visual impairment.

The provision of special education services begins with the prereferral process by which any child suspected of having a disability is assisted through interventions in the regular classroom in order to be successful in that setting. If such classroom-based interventions are unsuccessful or insufficient, the child is individually and comprehensively evaluated, using nondiscriminatory and language-appropriate assessment measures. At the completion of the evaluation, the child's teacher(s), parent(s), school administrator, special education teacher, school psychologist, and other relevant service providers meet to discuss the evaluation results and determine if the child has an educational disability. If the child has a disability, this group becomes the child's individualized educational program (IEP) team.

The IEP team members write an IEP that ensures that the child is provided with a free appropriate public education. The team members make decisions about educational and related services needed by the child in an environment that is most like that of nondisabled peers, also known as the *least restrictive environment*. A range of options exists for the placement of students with disabilities, including the regular classroom with special education support, a special education classroom with small teacher-to-student ratios, and homebound services for children who are unable to be successful in the school setting. Some of the related services available to children with disabilities include occupational therapy, physical therapy, social work, medical assistance, and counseling.

IEP teams meet at least once annually to determine the appropriateness of the child's written IEP. Every 3 years, the team decides if the child is in need of further assessment for planning purposes. In addition, this team meets anytime a child exhibits behavioral and/or emotional problems that negatively influence academic performance. The team members are required to conduct a functional behavioral assessment (FBA) to examine any patterns in the antecedents and consequences of the child's behaviors. A *manifestation determination* may be held at this time to determine whether the child's inappropriate behavior is a manifestation of his or her disability. Following this assessment, the team will create a behavior intervention plan (BIP) that includes positive behavior supports (PBS) in an effort to assist the child in behaving appropriately. Once a child turns 14 years old, the IEP team must also annually discuss plans for that student to transition from secondary school to higher education or employment settings.

Children and their parents have numerous documented rights related the IDEA. For example, no child can be denied services if he or she has a diagnosed educational disability. Written permission must be obtained from parents prior to conducting an individual evaluation. Parents also have the right to ask for an independent individual evaluation or a mediator if they don't agree with the evaluation results or any part of the IEP process for their child. It is encouraged and expected that parents are involved as much as possible in the educational planning for their child.

A number of major issues related to IDEA are currently under review. For example, some educators are concerned that children with disabilities cannot be disciplined adequately when they continue to violate school policies. Another issue is related to the criteria by which a specific learning disability

is identified. The reauthorization was completed by the fall of 2004.

—Joan B. Simon

See also Individualized Education Programs (IEP), School

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INDUCTIVE REASONING

Inductive reasoning is the ubiquitous mental activity of using existing knowledge to generate new knowledge that is likely, though not guaranteed, to be true. Inductive reasoning is required whenever people need to fill in gaps in their knowledge with "best guesses" about the state of the world. Generalizing that all snakes are black after encountering three black snakes, predicting rain in the afternoon upon seeing dark clouds in the morning, and using the analogy that an atom is like the solar system to infer new properties of atoms are all examples of inductive reasoning.

In the mid-1900s, psychologist Jean Piaget developed a highly influential developmental model of human thought that posited that inductive reasoning capabilities—and other kinds of reasoning capabilities as well—develop slowly from infancy until about 11 years old. Infants and toddlers were believed to be unable to reason but rather to be bound to their perceptions of their immediate environment. Children aged 7 to 11 years were thought to be able to do some simple reasoning but only with very concrete problems. Finally, after about the age of 11, children were thought to have fully developed abstract reasoning systems that could be used in any situation.

Today, in contrast, it is widely believed that inductive reasoning shows remarkable continuity across the life span. It is subject to similar strategies, influences, and biases in both children and adults. Limitations that were previously identified as resulting from an underdeveloped reasoning system are now more often attributed to a lack of content knowledge among children. For example, it would be difficult for a child—or an adult for that matter—to learn to diagnose diseases without first having a more general understanding of how symptoms and diseases are related. In other words, content learning and use of reasoning skills are now believed to go hand in hand.

Perhaps not surprisingly, people are most inclined to draw inferences between things that are highly similar to one another. For example, when reasoning about animal categories, people are more inclined to infer that "cheetahs have spleens" after finding out that "tigers have spleens" than after finding out that "mice have spleens." People also prefer to use typical things, rather than atypical ones, as the basis for their inferences. For instance, it is more compelling to transfer knowledge from robins to canaries than from ostriches to canaries because a robin is a more typical example of a bird. Influences of similarity and typicality are seen both in adults and in children as young as 2 years old.

People are also influenced by the perceived transferability of the property under consideration. For example, people are willing to transfer the eating of alfalfa from one rabbit to another, but they are not willing to transfer a scratched surface from one television to another. Interestingly, the property under consideration can also influence the perceived similarity of two situations. Adults, for example, perceive whales and fish to be highly similar when reasoning about whale behaviors, but perceive whales and bears as more similar when reasoning about whale biological properties. Such property influences have been seen both in adults and in children as young as 4 years old.

Inductive reasoning is very often contrasted with another kind of reasoning known as deductive reasoning. Deductive reasoning refers to the use of formal rules of logic to produce new knowledge that is guaranteed to be true to the extent that the available knowledge on which it is based is also true. For example, using the knowledge that "All living animals breathe" and "Fido is a living animal" to determine that "Fido breathes" is an example of deductive reasoning. Deductive reasoning can be applied only in situations that conform to certain logical structures. Inductive reasoning differs in that because it is not based on

formal rules, it cannot guarantee a true conclusion, but it can offer highly likely conclusions in a much wider range of situations.

—Andrea L. Patalano

See also Cognitive Development, Deductive Reasoning

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INFANCY

Infancy ranges in age from the moment of birth to about 2 years of age when the young child begins to use words to make sentences. In fact, the word "infant" means literally "one who is unable to speak." Infancy is unique in that it is the earliest stage of life outside of the womb and is viewed as the most important formative period of development. During this early stage of life, infants are remarkably dependent on their caregivers for all their needs. Prior to the emergence of single words, which occurs as the first year of life comes to an end, infants convey their needs to their caregivers nonverbally through facial and body expressions and verbally such as crying and cooing.

Very young infants spend a great deal of their time sleeping and when awake are occupied with bodily sensations and sensory experiences. As they get older, infants become more interested in exploring the objects in their environment and establishing relationships with the significant people in their world.

The single most significant aspect of human development is the impressive brain growth and plasticity that takes place during the first 2 years of life. The neural pathways of the human brain undergo major changes in response to environmental stimulation during infancy. Importantly, these changes in brain maturation along with environmental events contribute to the development of the ability to use and understand single words, which signals the emergence of language in the second year of an infant's life. As infants develop the ability to use language to communicate, it also enables them to think and conceptualize in the ways that we commonly identify as characteristic of only human beings. Play becomes central to an infant's exploration of his or her world. Infancy is also a period of marked changes in body size and motor skills. As the infant comes to the end of the second year of life, independent locomotion becomes firmly established and further characterizes the demarcation of infancy from later childhood stages. In spite of the uniqueness and importance of the infancy stage in human development, only recently are infants being considered worthy of systematic, scientific pursuit.

HISTORICAL PERSPECTIVES ON THE STUDY OF THE INFANT

Over the last few decades, the scientific study of the infant world has had a tremendous growth spurt likely due to innovative investigative techniques applied to study a broad range of infant abilities. We currently have more information on early perceptual, sensory, cognitive, language, motor, sensorimotor, social, emotional, and self-regulatory abilities than had been imagined 50 years earlier. However, regardless of the fact that new information on infant abilities has been amassing exponentially for the past 50 years, the contributions of the early theorists remain among the most influential in the field of infancy. By deeming children, including infants, worthy of systematic study, John Locke (1632–1704) and Jean Jacques Rousseau (1712–1778) laid the groundwork for modern developmental psychology even though they expressed different outlooks on what goes on in the mind of the infant.

Locke stressed the role of the environment as the main determinant of infant behavior, a precursor of modern behaviorism. This empiricist view has frequently been interpreted as support for "controlling" children, which many, including Rousseau, disagreed with. Rousseau who represented the romanticist view, recommended "understanding" infants rather than

seeking control of them. Infants, as depicted by Rousseau, are born with a natural ability to learn, although, in his view, they are born as "idiots automaton," knowing nothing.

As the 19th century began, the ideas of Charles Darwin (1809–1888) fueled the romanticist viewpoint. In particular, Darwin's assertion that human development was duplicating human evolution although at an accelerated pace furthered the viewing of infants as objects to be studied. Interestingly, Darwin was also considered a pioneer infancy researcher in that he kept a detailed diary of his sons' first 2 years of development, one of the first known "baby biographies." The early romanticism versus empiricism controversy was replaced in the 19th century by one of the most widely debated topics in the field of developmental psychology: Which contributes more to development, environment or nature?

An early proponent of the nature theory, Arnold Gesell (1880–1961) claimed the primacy of genetics in determining development. To capture what he considered the genetically determined unfolding of development, Gesell created scales to assess behavioral change in infants and young children. Contrary to Gesell, John B. Watson (1878–1958) believed that children could be taught just about anything, given the right kind of nurturing environment. To highlight the impact of environmental contribution, Watson emphasized parental responsibility for infant outcome; if the outcome was negative, it was the parents' fault. Both Gesell and Watson made a lasting imprint on how infants are viewed. In fact, heated discussion of the nature-nurture viewpoints continued throughout the 1800s, 1900s, and still is being debated today. While many researchers have sought to provide evidence that only one of these viewpoints is correct, the most up-to-date interpretation from years of systematic study by many developmental psychologists is that environment and genetics together contribute to infant development.

Sigmund Freud (1856–1939) believed that the value of understanding infant development lay in what it might reveal about the adult mind. While psychoanalytic theory stresses the importance of biologically determined aspects of psychological functioning, the importance of the environment, particularly as it encouraged the child's nature to unfold, was acknowledged as well. Freud's theories countered the extremist views of nature or nurture. Freud never used direct infant observation to understand the mind of the infant. Rather, he used reconstructive techniques. Like Freud, Jean Piaget (1896–1980) was ultimately interested in the working of the human mind throughout the life span, but in contrast to Freud, Piaget directly observed and experimented on infants to understand the progression of cognitive ability. Piaget's detailed descriptions of his own children led to his conceptualization of infant skills as inherited capabilities emerging as substages in an invariant order with each subsequent stage representing a stable reorganization of the infant in relation to his or her environment.

Throughout the last century, the focus of infant development has been to document the emergence and extent of a wide range of infant abilities. Theorists of the earlier centuries, such as Rousseau, claimed that infants were capable of very little. However, current scientific findings support the idea that infants have a myriad of capabilities evident from birth and even before. Contemporary infancy researchers have created innovative experimental paradigms that tap into the behavioral repertoire of infants in order to discover what goes on in the mind of infants. Dramatic findings from the past 50 years of systematic, scientific inquiry not only determined that infants are capable of learning more and learning earlier than previously believed, but also were dispensed readily to consumers because of the rise of mass media and electronic communication. Once in the public domain, research findings quickly became topics of major interest for parents, shaping the way babies were being raised. Producing intellectually precocious infants became somewhat of an obsession for many parents, resulting in less emphasis on rearing mentally healthy infants. The emphasis of infancy research has shifted somewhat in the past few years, however, to include the identification of factors associated with producing optimal psychological outcomes for infants and their families In addition to this recent interest in infant social, emotional, and behavioral development, contemporary infancy researchers continue to investigate a broad range of infant abilities.

THE SCIENTIFIC STUDY OF INFANT DEVELOPMENT

Overview of Infant Abilities Studied

Using the scientific approach, researchers have investigated various areas of infant development. To describe infancy, psychologists traditionally divide

development into separate domains of perception and sensation, motor skills, cognition and language, social behavior, and emotional and behavioral development. However, despite the depiction of infant development as discrete areas, research on infant development would suggest that there is much interdependence of all of the domains.

Perception and sensation involves the development and use of the infant's senses, specifically vision, touch, hearing, smell, vestibular-proprioceptive movement, and taste. Although not fully developed at birth, perception and sensation are critical experiences for the infant; in fact, until infants can engage in active exploration of the environment, which occurs toward the latter part of the first year of life, they spend most of their time looking at, listening to, touching, smelling, and tasting their environment. The development of motor skills enables infants to become independent explorers of their environment. Investigating the development of perception and sensation in infants includes not only the study of the emergence of gross motor skills such as crawling but also fine motor skills such as hand-eye coordination. Motor development progresses from simple acts, such as turning over, to more complex motor skills, such as walking, to fine motor coordination of objects, such as little pieces of food, crayons, or toys.

Cognitive development refers to the study of mental processing skills used by infants to understand their world, with the development of representational and symbolic thinking critical markers for later optimal development. Although findings from scientific investigations prove that even newborns are not in a state of "blooming, buzzing confusion," as characterized by William James in the 1800s, it is more toward the end of the second year that infants behave in a way that indicates they are actually reasoning and planning actions mentally. Prior to that, infants do show the ability to form conceptual categories but do not have the cognitive skills to mentally represent a plan of action in thoughts or words in order to choose appropriate plans of action and eliminate less worthy plans. Processing of information becomes more sophisticated with the emergence of symbolic thinking, and social relationships are enriched as infants develop shared meaning with others through language.

Infants process and express social cues long before they ever use language to form relationships. Descriptions of mother-infant relationships by Daniel Stern in the 1980s depicted the nonverbal and verbal "dances" between caretakers and infants, which Stern described in terms of eye gaze, touch, and positive verbalizations such as cooing. Tiffany Field studied how mothers and infants develop shared experiences by analyzing face-to-face interactions during which infants were seen matching their own experiences with that of their caretakers. The interchange between social and emotional development becomes clear when considering the studies by Mary Ainsworth that showed that infants who are secure in their relations with their caretakers show good self-regulation of emotions upon separations and reunions.

Investigators studying emotional development during infancy focused on the emergence of feeling states, how emotions are expressed, and how infants interpret the emotions of others. Michael Lewis and colleagues evaluated infants' facial expressions and found that the emergence of basic primary emotions, such as joy, interest, sadness, and anger, is apparent from birth but secondary emotions such as shame and guilt emerge in the second year of life. Studying behavioral skills of infants involves the measure of inherited temperament and later learned patterns of behavior. A number of researchers have paid particular attention to the emergence of self-regulatory skills and how infants use these skills to cope with everyday stresses, such as separation and frustration, sleeping through the night, adjusting to new food tastes, and inhibiting one's impulses when told "no." Jerome Kagan and colleagues engaged in extensive longitudinal studies and determined that infant's feelings, affects, and emotions are moderated by individual, inherited temperament traits, such as behavioral inhibition, and that these temperament traits persist in one form or another into later childhood, adolescence, and adulthood.

Recent Scientific Advancements

The dramatic increase in our understanding of infant development over the past 50 years can likely be attributed to the growth of scientific approaches utilized to study infants as indicated earlier. It is generally agreed that the best way to investigate the world of infants is to observe them directly in a controlled environment using systematic experimentation. Use of a scientific approach yields better validity and reliability and can control for the effects of experimenter bias and subjectivity. Much of the research prior to the second half of the 20th century used less scientific

means to study individual infants. For example, Piaget, among others, documented qualitative case studies from baby biographies. While many researchers agreed that Piaget ushered in a direct, rather than retrospective, approach to studying infant development, his investigative style was not scientifically rigorous, which may account for some of the discrepancies found by later researchers regarding the emergence of early cognitive skills. It is well acknowledged, however, that infants are not as easy to study as older children or adults.

The mode of communication relied on most frequently by researchers in the field of psychology to collect information is language expression, typically verbal and sometimes written. To systematically study infants, researchers had to determine how to develop methods that compensated for the infants' lack of mature expressive ability. Infants cannot describe their feelings, fill out self-report measures, complete standardized written tests, or respond to interview questions. Because it is so difficult to utilize typical methodology with infants, infancy researchers have deduced what is going on in an infant's mind by developing creative procedures for systematically measuring responses using behaviors within an infant's repertoire, such as crying, sucking, tracking objects visually, kicking, or orienting the head.

Habituation/Dishabituation

The habituation paradigm measures infant response to repeated exposure of the same visual or auditory stimulus. This paradigm is based on the premise that infants, like older humans and animals, will show reductions in attention as they encounter the same stimulus repeatedly, which is determined by assessing length of visual gaze to the familiar stimulus. Eventually infants will fail to attend when they have "habituated" to the stimulus as if they were bored. The gradual decline in looking time over repeated presentations or trials due to increasing familiarity with the same stimulus is known as habituation. Researchers also assess how quickly infants recover or "dishabituate" when changes are made to the original stimulus and infer from changes in looking behavior whether infants can detect differences. Typically, a criterion for initial looking time duration is determined and habituation occurs when subsequent presentations consistently yield durations shorter than the habituation criterion. Following habituation, the stimulus is changed. If the infant's looking time increases from the habituation criterion, signaling dishabituation, or recovery, it is inferred that the infant can tell the difference between the two stimuli. If the infant cannot detect a difference, looking time will be shorter than the habituation criterion.

Using this paradigm, Bennett Bertenthal and colleagues found that 5-month-old infants when presented with point lights of a person can discriminate when that person is moving from a random, disorderly pattern of the same person's point lights. Bertenthal interpreted this as suggesting that young infants have stored knowledge of the human form and its movements. Tiffany Field and colleagues used the habituation/dishabituation technique and found that even newborns could differentiate between happy, sad, and surprised facial expressions. This paradigm has also been used to investigate many other aspects of infant development including recognition of the mother's face, object categorization, and the detection of emotions and speech sounds.

Preferential Looking and Violation of Expectancies

Another creative approach to understanding infant behavior relies on head turning to determine preferences and is called the paired-preference approach. For example, in a number of preferential looking studies, infants are required to show preference between two visual stimuli presented side by side or two sounds presented to one or the other ear. Investigators try to determine which of the two stimuli is most preferred by the infant by judging where the infant is looking. In the 1960s when infancy researchers first began to use innovative experimental techniques, Robert Fantz and his colleagues used the preferential looking paradigm to document that infants could distinguish visual patterns and, in fact, demonstrated marked visual preferences by infants when presented with two different patterns side by side. To do this infants were introduced to competing patterns while in an infant seat or on their mother's lap and in a darkened room. Patterns were mounted as a display of flashing lights on a screen directly in front of the infant. In earlier studies, observers gazed through a small peephole in a screen to allow them to look directly at the infant's face and judge where the infant was looking.

As the preferential looking methodology became more sophisticated, researchers such as Marshall

Haith detected the precise position of the infant's gaze by using an electronic sensor to measure the angle of reflection of an invisible infrared light reflected off the infant's cornea. By using the preferential looking method, researchers have found that young infants prefer the sound of their mother's voice and the odor of their mother's breast milk compared to that of another woman. Recently researchers have used variations on preferential looking to cleverly detect cognitive abilities in infants not documented or even believed to exist earlier because of limits in the methodology of prior time periods. For example, in the 1990s Karen Wynn used preferential looking as part of a violation of expectancy paradigm to show infants could detect the outcome of the addition or subtraction of one discrete object from a small collection of two or three objects. Wynn interpreted this as evidence of precocious number concept and concluded that 5-month-olds discriminated between quantitative outcomes when their expectancy of addition or subtraction solutions was violated.

Classical and Operant Conditioning

The interest in behaviorism during the 20th century led a number of infancy researchers to try conditioning young infants to determine aspects of conditioned learning. Hans Papousek, for example, demonstrated classical conditioning in newborns by pairing a neutral stimulus (a sound) with an unconditioned response (head turning). The sound eventually became the conditioned stimulus triggering the head turning, which became the conditioned response. Specifically, Papousek paired a sound with the turning of an infant's head by touching the corner of the infant's mouth with a bottle. After repeated exposure, as soon as the sound was heard the newborns turned their heads in anticipation of contact with the bottle. Thus, the neutral stimulus, the sound, became a conditioned stimulus and the head turn became the conditioned response.

While the classical conditioning of an infant demonstrated that infants have the potential to learn, infancy researchers sought to go further and investigate whether infants can be instrumental in changing their own behavior to secure reinforcement, a technique referred to as operant or instrumental conditioning. Operant conditioning has been used by many infant researchers to assess whether infants can learn that their own behavior controls environmental stimuli, thus actively engaging in the learning process. In the 1970s, James B. Watson, one of the first infancy researchers to utilize this approach, conditioned infants to turn their heads to produce movement in an overhead crib mobile. In the 1980s Anthony DeCasper and William Fifer used newborn infants' nonnutritive sucking responses to activate a tape recording of either the mother's or an unfamiliar female's voice reading from a book. DeCasper and Fifer found that the newborns learned that different pause lengths between bursts of sucking would differentiate which recording would be turned on and as a function of what was learned infants consistently sucked in such a way that would turn on the mother's voice.

A series of studies by Carolyn Rovee-Collier and colleagues investigated infant learning and memory utilizing a paradigm termed mobile conjugate reinforcement, a variant of operant conditioning. Infants learned to produce movement in a crib mobile when placed supine in their cribs with a ribbon extending from one ankle to the bar of a mobile stand. Movement in a mobile attached to the mobile stand was contingent on the kicking of the infant's ankle. Infants readily learned to increase their ankle movements over an initial baseline and if presented with the same mobile at later increments of time demonstrated good short- and long-term retention. Rovee-Collier and colleagues used mobile conjugate reinforcement to demonstrate memory for color, number of components, and even contextual determinants of memory, such as odor and music. Investigation of infant response to changes in the mobile suggested that infants differ in how they react to violations of the expected type of stimulation with some infants demonstrating extreme negative reactivity and others learning to compensate for the change.

Physiological Responses

Infancy researchers have also used physiological indices to expand on or substantiate behavioral measures of infant ability and from this infer what is going on inside the infant's mind. Two common ways that have been used to assess levels of physiological arousal under a variety of circumstances are by using instruments that measure heart rate and galvanic skin response. Recent technological advances have also made possible physiological measurements of electrical brain activities recorded by surface electrodes or brain scans. Using physiological measures has been particularly

useful in providing researchers with a way to investigate infant abilities prior to the infant's capability of expressing the ability behaviorally. For example, depth perception was assessed in infancy using a visual cliff paradigm that required crawling. Based on this research by James and Eleanor Gibson and colleagues, it was concluded that at 6 months of age infants are capable of perceiving the drop-off between themselves and their mother. However, does depth perception emerge at 6 months of age or was research on the emergence of depth perception limited because the visual cliff paradigm could not be used with young infants who were not yet crawling? To study depth perception in younger infants, researchers cleverly attached heart monitors to the infants and looked at changes when young infants were merely placed next to the visual cliff. Moderate arousal signified by changes in heart rate was found in infants as young as 2 months, suggesting depth perception occurs earlier than previously determined.

A number of infancy researchers have studied emotional development using physiological measures to corroborate findings originally yielded by behavioral measures. Jerome Kagan and colleagues initially used behavioral responses to investigate how infants respond to unexpected or novel situations. They found that infants who respond with crying and high motor activity, a response dyad he termed "inhibited temperament," tend to develop into children who avoid people, objects, and situations that are novel or unfamiliar, whereas uninhibited infants tend to develop into children who spontaneously approach novel persons, objects, and situations. As he continued investigating inhibited temperament longitudinally, Kagan developed an interest in determining if physiological differences could further distinguish between inhibited and uninhibited temperament types. His next step was to utilize the latest developed technology and he measured functional MRI signal response within the amygdala, finding, as he suspected, variations in amygdalar responses to novelty. Adults who as infants were categorized as inhibited showed greater functional MRI signal response within the amygdala to novel versus familiar faces compared with those adults categorized as uninhibited during infancy. Kagan interpreted these findings as evidence of early appearing manifestations of brain functions relating to temperament that are preserved into early adulthood.

Physiological findings also broadened our understanding of how self-control of emotion develops during infancy. Stephen Porges developed a procedure called vagal tone to measure heart rate variability that occurs at the frequency of breathing. Suppression of vagal tone has been found to be associated with the activation of coping strategies in children. Susan Calkins used this measure to investigate relations between mother-infant interactions during which the mother's face remained still and infants' physiological responses. Infants showed suppression of vagal tone during the still-face interaction indicating the need for physiological regulation of distress. Infants who did not suppress vagal tone (did not activate coping strategies) during the still-face interaction showed less positive affect and higher reactivity and lower mother-infant synchrony in normal play.

INFANCY IN PERSPECTIVE

Learning about infant development is becoming so sophisticated that the questions that can be answered about infant ability seem limitless. Infants are clearly not "idiots automaton" as proposed by Rousseau centuries earlier, and new scientific inquiry confirms that Piaget, among others, underestimated the emergence of infant skills abilities. Researchers have even found novel ways to document perceptual and sensory abilities in the developing fetus. It has become clear that many recent research findings have had a dramatic impact on how parents regard their infants. Our recent history has shown that many parents influenced by findings of early skill development became determined to produce "smarter" babies as early in life as possible. To produce "superbabies," many parents enrolled their infants in programs of structured education before the age of 3 years. This also led to the phenomenon of the "supermom," the woman who raises superbabies while holding down a job and performing as a "perfect" wife. Perhaps as a reaction to the overemphasis on achievement for both infant and mother, the early 21st century has seen a rise in concern for the psychological outcomes of infants and parents. The current research trend focuses on topics such as emotional intelligence and the goodness of relationships between parents and children. From an applied standpoint there is also growing emphasis on early detection of developmental problems and interventions that may alleviate or even prevent delays. Knowing when certain skills emerge during infancy can help clinicians determine mature or immature developmental status of infants and identify those

infants at risk for future difficulty. In spite of centuries of study about infant development, it seems like our knowledge about this first stage of life outside the womb is still in its infancy, but it is clear that continued scientific research is valuable for our society.

—Phyllis S. Ohr

See also Apgar Score, Babinski Reflex, Crawling, Fetal Medicine, High-Risk Infants, Infant Mortality

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INFANT MORTALITY

Infant mortality is defined as the death of an infant prior to its first birthday. This definition clearly excludes death *in utero*, or stillborn infants. Although there has been a gradual reduction in the worldwide rate of infant mortality over the last 20 years, this remains a significant public health concern, as infant death continues to remain a concern throughout the world. The overall rate of infant mortality is around 36 deaths per 100 live births, which worldwide translates into roughly 5 million deaths per year. The largest declines in rates of infant mortality have been evident in more highly developed countries such as the United States. Interestingly, these rates declined steadily through the 1990s but have recently turned upward again for reasons that will be discussed later. For example, in the United States for the year 2000, the rate of infant mortality reached an all-time low of 6.9 deaths per 1,000 live births. Much of this reduction during the last decade was attributed to an increase in maternal education about the prevention of infant death and illness, the development of new medical strategies for supporting infants born at high risk of infant mortality, and a record number of mothers getting early prenatal care. The rate of infant mortality in the United States remains relatively high compared to that of other industrialized countries. For example, despite the improvements cited above, the nation still ranked 27th in infant mortality among industrialized countries in an analysis of 1997 data. Recent data indicate that Sweden is among the countries with the lowest recorded rates of infant mortality in history, with a rate of 3.6 deaths per 1,000 live births. Importantly, disparities remain among racial and ethnic groups in many measures of maternal and child health, both in the United States and elsewhere. For example, the infant mortality rate among black children in the United States is more than double that for white children. Recent data show that whereas the infant mortality rate for Caucasians and Hispanics averages 3.3%, for African Americans it was over 8%.

RECENT PROGRESS

An ongoing emphasis on the importance of health behaviors during pregnancy including stress reduction, avoidance of drugs and alcohol, abstinence from smoking cigarettes, and the importance of maternal nutritional status have also contributed to this positive change. Public service campaigns supporting the placement of infants on their backs to sleep have also helped reduce this rate by reducing the occurrences of sudden infant death syndrome (SIDS). Moreover, although significant ethnic disparities remain in the rates of infant mortality in the United States and elsewhere, in recent years rates of infant mortality in all ethnic groups as well as in other high-risk populations such as adolescent mothers were also lower during the 1990s than in previous recording years. Very recently, however, the rate of infant mortality in the United States increased after a long period of decline. This

change has been attributed not to reversal of the abovementioned positive trends, but rather to an increase in the average age of childbearing in the United States. More and more women are choosing to delay pregnancy and childrearing until later in life, a time at which the risk of infant mortality as well as that of pregnancy complications and developmental challenges increases significantly.

An additional, related challenge to that of SIDS is the potential for the practice of sharing a bed with a young infant to increase the likelihood of infant mortality, via SIDS or suffocation. This is a complex issue, and the role of bedsharing in infant mortality remains under debate. Some have suggested that bedsharing might reduce the risk of SIDS as a parent would be present to rouse the infant in the event that the infant stopped breathing, but the American Academy of Pediatrics (AAP) has stated that there are no conclusive scientific studies showing clearly that bedsharing reduces the incidence of SIDS and points out that several studies do strongly suggest that under certain circumstances, bedsharing may, in fact, increase the risk of SIDS. The practice of bedsharing is tied to a variety of infant care issues, including breastfeeding and cultural traditions, and thus, there has been no blanket statement condemning the practice as endangering infants.

Educational campaigns, however, have been effective in educating parents about the potential risks of bedsharing along with guidelines for other safe infant sleeping practices including the "back to sleep" campaign, and other aspects of appropriate choices for infant bedding. One important aspect of this educational campaign has been to describe situations to parents in which bedsharing may be especially problematic, including cases in which the parent is obese and is thus more likely to suffocate the infant or the parent has a drug- or alcohol-use problem, and may again be more likely to suffocate the infant and less likely to rouse if the infant is distressed. An additional caution to parents considering bedsharing is that some studies suggest that SIDS, both in bedsharing situations and in crib sleeping situations, is more common among infants whose mothers smoke in the postpartum period. The connection between smoking and bedsharing is not easily separated from that of smoking and SIDS, however, but it has been suggested that smokers who bedshare with an infant may put the infant at additional risk merely by virtue of additional smoke exposure from a parent smoking in bed.

ONGOING CHALLENGES

As mentioned above, two additional factors that may contribute to infant mortality is the occurrence of premature labor and delivery and infants born with low birthweight. Premature labor is defined as labor that commences prior to 37 weeks of gestation, and low birthweight (LBW) is defined as an infant born weighing less than 5 pounds. Recently, maternal stress has been identified as a potential contributing factor to these poor outcomes; factor in early development, and there is growing evidence that prenatal psychological and environmental stresses are detrimental to pregnancy outcome. Importantly, there are significant disparities among ethnic groups in poor pregnancy outcomes including LBW and prematurity, and these may be contributing factors to the disparities in infant mortality seen in these groups. Maternal stress experiences during and after pregnancy can range from severe (e.g., trauma) to moderate (e.g., life event changes) to low (e.g., experience of daily hassles). Although some studies have shown minimal effects of prenatal stress on pregnancy, the majority of studies show that stress experienced throughout pregnancy can negatively affect pregnancy and infant outcomes. For example, significant stress around conception (e.g., death of a loved one, divorce) resulted in greater chances of delivering an infant with conotruncal heart defects, neural tube defects, and isolated cleft lip, and trauma from an earthquake had a greater negative effect on gestational length if experienced earlier in the pregnancy. Stress experiences later in pregnancy are related to lower birth weights, reduced gestational length, preterm labor and delivery, and infant mortality; infants of stressed pregnancies have higher rates of childhood allergies and asthma, and perinatal stress appears to contribute to respiratory illness in infancy. The implications of these studies are important: 70% of infant perinatal deaths in the United States are related to LBW, preterm delivery, and restricted fetal growth. Those infants who survive the perinatal period are at greater risk for physical and cognitive developmental delays in later years.

ETHNIC DISPARITIES

Especially distressing when examining the frequency of poor pregnancy outcomes in the United States is the fact that the rate of occurrence of these events is significantly higher in non-white minority

women than in Caucasian women. For example, the rate of infant mortality and LBW is nearly 2.5 times higher among African American women than among Caucasians. Although Hispanic women as a whole have been reported to have rates of LBW similar to those of whites, women of Puerto Rican descent and highly acculturated Hispanic women have significantly higher rates of LBW, pregnancy complications, and poor infant outcomes than their Caucasian counterparts. A significant component of considering poor pregnancy outcome in Hispanics is the "Hispanic Paradox" that has been described by several researchers, which states that although Latinas suffer similar socioeconomic challenges as other minority groups, they have lower rates of LBW and infant mortality than other minorities and white women. Recently, however, several published reports have called this paradox into question. These studies show, among other things, that although relatively few LBW infants are documented in Hispanics compared to other minority groups, errors in data recording and interpretation often mistakenly represent the rates of LBW in this population. For example, the reported lower rates of LBW in Hispanic infants in their sample reflected more preterm delivery and lower mean birth weights, and thus fewer infants who were small for their gestational ages, in Hispanic women compared to whites. This apparent paradox has also been attributed to other types of recording, sampling, and data-driven errors, such as not uniformly considering country of origin of those being sampled, and inappropriate selection of data. For example, when examining the Hispanic Paradox of infant mortality, removing infant deaths by SIDS or defining infant mortality as exogenous mortality increases the rate of infant mortality in Hispanics to 26% higher than that reported for whites. Thus, although the Hispanic Paradox of LBW and infant mortality is often cited, it may be, at some level, an artifact of data recording, selection, and interpretation, and should not be used to discount the importance of addressing poor birth outcomes in Latinas.

There are several other aspects of pregnancy success that are compromised in Hispanic women that emphasize the need for considering ethnic differences in addition to racial differences in pregnancy outcomes in minority women. For example, American-born Latinas have twice the rate of LBW, preterm delivery, and pregnancy complications as Latinas born in Mexico, and Mexican-born Latinas living in America have higher rates of adverse pregnancy outcomes compared to Caucasians. Moreover, inadequate weight gain during pregnancy associated with poor infant outcome is a significant problem in Hispanic women compared to whites, and rates of pregnancy-related mortality are significantly higher in Hispanic and African American women. Taken together, these studies show a disproportionate frequency of poor pregnancy outcomes including complications, LBW, and preterm labor and delivery among minority women, both based on race and ethnicity, and underscore the need for understanding the complex biological, social, psychological, and cultural factors that contribute to these disparities.

STRESS

Several investigators have suggested that stress, social structure and support, and other psychosocial factors are critical in the disparities in pregnancy outcome and infant mortality observed between minority and nonminority women. For example, although stress exposure during pregnancy is generally related to poorer outcomes regardless of racial or ethnic group, the negative effects of stress appear to be more severe for African American women than for Caucasians. For example, in a study of LBW in urban populations, Orr and colleagues found that although many prenatal behaviors such as smoking and hypertension in pregnancy were risk factors for LBW for both Caucasian and African American women, exposure to stressors was only predictive of LBW for African American women. Other investigators have shown that non-white women experience more adverse birth outcomes associated with prenatal stress, poor social support, and low self-esteem than white women, further suggesting that the combination of being a member of a minority group and psychosocial challenges may be especially perilous for pregnancy success. Interestingly, several investigators have noted ethnic differences in stress experiences and in the effects of coping with psychosocial stress. In a study of the factors contributing to clinical depression in adult women, Myers and colleagues found not only higher rates of stress-associated depression among African American women compared to whites, but also that the combination of being Latina and high levels of perceived stress were predictive of more severe depression. Moreover, a significant stressor for non-American born Hispanic

women is the challenge of assimilating and adjusting to American culture. This type of acculturation stress has been associated with generally poorer health in Latinas, more unhealthy behaviors such as smoking and drinking, and, importantly, with poor birth outcomes including LBW and prematurity. Thus, although women of all backgrounds are affected by stress in meaningful ways, women who are members of minority groups may experience more severe effects of stress on their mental and physical health, and on their unborn children.

An important aspect of considering the role of prenatal stress in pregnancy outcome and infant mortality is determining the biological mechanisms through which the external experience of stress exposure might translate into challenges to pregnancy. Stress is often defined as events, situations, emotions, and interactions that are perceived as negatively affecting the well-being of the individual or that cause responses perceived as harmful. The concept of a psychosocial stressor encompasses life experiences, including changes in personal life, job status, housing, domestic violence, and family makeup, which require adaptive coping behavior on the part of the affected individual. Stressor exposure activates a cascade of physiological events that help the individual to cope with stress-inducing stimuli and affects numerous physiological processes and systems. Perception of a stressor activates the sympathetic nervous system (SNS), a process known as the "fight or flight" response, and increases release of catecholamines including norepinephrine (NE). Activation of the hypothalamic-pituitary-adrenal (HPA) axis is a component of this response, beginning with the release of corticotrophin-releasing hormone (CRH) in the hypothalamus. CRH stimulates the anterior pituitary gland to release adrenocorticotrophin hormone (ACTH), which, in turn, stimulates cortisol release from the adrenal cortex. These neurochemical changes temporarily direct energy toward dealing with the stressful situation and away from other bodily functions. At the conclusion of short-term stress, the body quickly returns to homeostasis. In contrast, chronic stress prolongs activation of these systems and has detrimental effects on health and immunity. Existing evidence shows that stress experienced by mothers can have deleterious effects on pregnancy and infant development, and can adversely affect immunity and health. Further, there is evidence that there may be differences in stress responsiveness among racial and ethnic groups, suggesting that psychosocial stress may affect minority women differently. For example, African Americans have more extreme vasoconstrictive responses to laboratory stress and more pronounced neuroendocrine responses to work stress than Caucasians. Moreover, the actual experience of stress is likely to differ across ethnic groups, as minority groups in this country may experience more chronic stress as a result of deeper poverty, acculturation, decreased access to health care, and experience of institutional racism in the workplace.

Activation of the stress response affects human pregnancy, and women experiencing preterm labor and delivery have significantly higher levels of plasma cortisol and CRH prior to onset of labor than women who deliver normally. Considerable interest has focused on the role of stress-related CRH production in modulation of labor and delivery because CRH may act as a signal for normal labor, and stress-related elevations of CRH may induce preterm labor. Others suggest that stress-related changes in immune function may contribute to these effects. A large body of work shows that psychological stress modulates physiology independently of pregnancy. Although these connections have an adaptive role in channeling energy to deal with the immediate stress, this relationship may result in changes in endocrine and immune function that put pregnancies at risk when the stress is of long duration as many psychological or social stressors may be. For example, when maternal CRH levels increase, they engage adrenal functioning in the fetus, producing higher fetal cortisol levels. Recently, animal and human studies support the role of maternal-fetal-placental CRH in modulating infant development and behavior, and suggest that prenatal stress may exert its effect on infant development by altering not only infant stress responsiveness, but also infant neural development. If, as some have suggested, infants with high basal cortisol levels are more prone to stress and distress, then a potential connection exists between high stress during pregnancy, infant neuroendocrine function, and neurobehavioral development. These studies show that prenatal stress has negative consequences for pregnancies and infants, suggest that factors such as ethnic background and stress responsivity may mediate these interactions, and underscore the importance of understanding both the significance and mechanism of these effects to improve maternal and child health. Thus, not only may prenatal stress increase the risk of pregnancy

complications and infant mortality, but it may potentially alter the course of infant development.

PREVENTION

An important aspect of managing infant mortality and its root causes is developing public information programs to assist mothers and prenatal care providers in doing what is possible to prevent suboptimal pregnancy outcomes and ultimately, infant mortality. In the United States a variety of programs have been designed to both understand and prevent infant mortality. These efforts include programs to improve access to prenatal and newborn care, including Healthy Start, Medicaid, and the State Children's Health Insurance Program (SCHIP). In addition, public health campaigns to promote healthy habits among parents expecting a child or caring for an infant to prevent child malnutrition as well as medical research to better understand and prevent birth defects, premature birth, and sudden infant death syndrome (SIDS) and to promote healthy infant development are focused on preventing and understanding infant mortality.

Improving maternal physical and mental health during pregnancy continues to be a priority for reducing infant mortality. Clear connections exist between some types of maternal illnesses during pregnancy and infant mortality, and there is compelling support for the hypothesis that stress may exacerbate the occurrence of these effects by reducing maternal immune function. Ongoing work in several laboratories is addressing this connection in the hope of further supporting healthy pregnancies. Importantly, infant mortality is not the only negative by-product of prenatal maternal stress. Maternal physical and mental stress is also associated with a variety of developmental problems and delays including chronic illnesses. Perinatal stress has already been linked to the development of childhood illnesses including asthma, allergy, and respiratory syncytial virus, and addressing the role of prenatal stress and maternal health and immunity in pregnancy and in infant immune system development will provide new data for the treatment and prevention of these effects.

The need for thorough, biopsychosocial approaches to supporting maternal prenatal experiences and outcome issues is clear. As already noted, the fact that a range of stressors from low to severe can alter developmental experiences of the embryo and fetus, and thus of the developing infant and child, has major relevance for child health and welfare. Low birth weight, one of the greatest predictors of at-risk status for infants in the first year of life, is an outcome implicated in a number of studies of psychosocial stress during pregnancy. Existing data clearly show that maternal stressors of various types need to be taken seriously during pregnancy, and thorough screening and intervention measures need to be investigated.

The development of prenatal support strategies groups to assist in buffering women and their infants against the impact of prenatal stress is critical, but interventions also must continue through the first years of childhood, as social-emotional development of infants with less optimal emotion regulation has been linked to maladjustment in children between ages 2 and 12, and across variables of social class and ethnicity. Infant–mother relationships can be enhanced through intervention, in situations of at-risk infants and even in those families with not-at-risk status. For example, research has shown that children and parents who were part of a counseling group, regardless of risk status, were able to improve goodness of fit between infant/child temperament and parent interaction, and had fewer psychiatric problems than controls at ages 5, 10, and 14 years. Provision of programs such as these for women with at-risk pregnancies may help to support not only healthy infants, but also family and child development by providing comprehensive biopsychosocial support at critical points in development.

Finally, early and continuous prenatal care helps identify conditions and behavior that can result in low birthweight babies, such as smoking, drug and alcohol abuse, inadequate weight gain during pregnancy, and repeat pregnancy in 6 months or less. Additional preventive strategies include public education about folic acid consumption during pregnancy, placing infants on their backs to sleep to prevent SIDS, reducing teen pregnancy, and reducing transmission of HIV from mothers to infants. All these measures, combined with ongoing research, will support further understanding and prevention of infant mortality.

—Mary Coussons-Read

See also Infancy, Sudden Infant Death Syndrome (SIDS)

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INFANTICIDE

Infanticide is the killing of an infant or young child(ren) by a parent or stepparent; however, specific terminology varies with the age of the victim. Murders occurring within 24 hours of birth are referred to as neonaticides. Those committed after the first 24 hours but prior to 1 year of life are labeled as infanticide. And, the murder of a child more than 1 year of age is referred to as filicide.

In the United States, mothers commit the majority of filicidal acts. Fathers are more likely to kill older children, and as a result of physical abuse. Homicide is the leading cause of death resulting from injury for infants less than a year old. Slightly more males under the age of 1 are killed than females. In 2000, 10.3 and 7.8 per 100,000 males and females were killed, respectively. According to FBI Supplementary Homicide Reports, from 1976 to 1991, deaths of children less than 1 year of age increased while the number of older children (i.e., ages 1 through 4) remained relatively constant. The number of deaths of children less than 1 year of age became stabile between 1991 and 2000.

Although alternative labels have been offered, the act of infanticide is not a new phenomenon. Documents of cases of parental child murders can be traced throughout history due to superstitious beliefs, poverty, and overpopulation. In ancient Greece, children with birth defects were destroyed in fear of the cost they would incur the state. Conversely, during the Middle Ages, Christian doctrines and Protestant churches strongly enforced laws against killing a child. More recently, for hundreds of years, female infanticides were prominent and socially accepted in India and China. Impoverished Indian families feared they would be unable to fulfill their daughter's responsibility of a marriage dowry. In China, food and medicine were sparsely available, and it was better thought to invest time and money in raising a productive male than a consuming female.

Child murder is relatively uncommon; however, the majority of child deaths are at the hands of parents (or stepparents). The unthinkable act of infanticide has received a growing amount of media attention. Highly publicized cases have lead to a growing interest by the public and law enforcement agencies alike. In an attempt to determine causality, many researchers have categorized different types of infanticidal acts: accidental, acutely psychotic, altruistic, spouse revenge, and unwanted child(ren).

Accidental deaths are typically those that result from physical punishment gone too far. Acutely psychotic cases, the most common, usually result from mental illness. Parental psychosis can range from severe depression to delusions. Altruistic cases are those where the parent believes killing the child is the merciful way to protect them from current hardships (e.g., economic struggles, abusive spouse). Spouse revenge cases are attributed to the desire to hurt the husband or wife by inflicting death on the child. Unwanted children deaths typically result from teenage pregnancies and low socioeconomic families. Neonaticides are most frequently the result of an unwanted pregnancy. Young (or teenaged), single, uneducated women offer the highest risk in this category. Because the majority of neonaticide victims are born outside of a hospital, the prevalence is probably underrepresented.

Such births can lead to obstetric complications and accidental death. Inadequate social support, and possible embarrassment by the church and family, might contribute to the prevalence of neonaticides.

Circumstances vary for each parent, child, and case; however, the most common methods of killing an infant include battering, maltreatment, suffocation, strangulation, drowning, and death by firearm. Stabbing, mutilation, and death by fire are the least common. Infanticide is most often viewed as a crime of desperation or result of mental illness rather than a premeditated, malicious act. The legal systems employed in England and Canada offer statutes that address infanticide as a result of postpartum depression, thus leading to lessened sentencing. Conversely, in the United States, mental disease or defect is not in itself cause for a just defense. A better understanding of the pathology and criminal nature of perpetrators is necessary to provoke early prevention and provide help to those who need it.

—Dawn R. Hurst

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INFECTIOUS DISEASES

Infection refers to the successful transmission of a microorganism (bacterium, virus, fungus, or parasite) to the host, with subsequent multiplication of the microorganism (infectious agent). The host response to infections is highly variable and depends on the relationship between host and infectious agent. An infection may be subclinical (unapparent) or may result in disease. The disease is the clinical expression of the infection and indicates that the microorganisms not only are present and replicating, but that they are also disrupting the host to the extent that signs and symptoms are being produced. A sign (e.g., fever, rash, or vomiting) is the objective evidence of damage to the host, whereas a symptom (e.g., headache) is subjective evidence of damage to the host. A subclinical infection is marked by absence of visible symptoms, but there is a measurable host immune response, either through the appearance of specific antibodies or through cell-mediated reactions, such as positive tuberculin test results.

An individual who harbors a microorganism without evidence of disease and, in some cases, without evidence of a host immune response is called a carrier. The carrier status may take place during the latent phase of the incubation period as a part of asymptomatic disease, or may be chronic and persist following recovery from illness. Carriers may shed organisms into the environment intermittently or continuously, and this shedding may lead to transmission of the infectious agent. Shedding and potential transmission may be increased by other factors affecting the host, including infection by another agent.

An infection is the product of three interrelated factors: (1) the agent, (2) the host, and (3) the environment.

AGENT

The infectious agent is the first link in the chain of infection. Factors that are important in the characterization of the agent are as follows: (a) *Infectiousness* is the easiness with which a pathogen can spread in a population. (b) *Pathogenicity* is the ability of an agent to cause disease. An example of an organism with high pathogenicity is the smallpox virus. There is no known human carrier state for this agent; once infected with the virus, the host will develop disease. (c) *Virulence* is the pathogen's power to cause severe disease and therefore is a measure of the severity of the disease. The virulence of organisms ranges from slightly to highly virulent. (d) *Invasiveness* is the ability of a microorganism to invade tissues. For example, *Vibrio cholerae* is not invasive, remains localized to the intestinal mucosa, and produces a toxin that is responsible for signs and symptoms. In contrast, Shigella is highly invasive and, by invading the submucosal tissue, becomes established

and causes disease. (e) *Infective dose* is the quantity of the agent necessary to cause infection; it varies from microorganism to microorganism and from host to host and is influenced by the mode of transmission. In a study of typhoid fever, it has been demonstrated that with an inoculum of 10^3 *Salmonella typhosa*, no clinical disease develops in normal volunteers. When the dose of the inoculum is increased to 10^7 or to 10^9 bacteria, there is a 50% and 90% attack rate, respectively. The attack rate is the ratio of the number of new infections divided by the number of exposed, susceptible individuals in a given period. (f) *Specificity* refers to how microorganisms may be specific with respect to their range of hosts. Some salmonella species, such as *S. typhimurium*, are common to both animals and humans, but others have a narrow range of specificity; for example, *S. dublin* primarily infects bovines, while *S. typhosa* is known to infect only humans. (g) *Antigenicity* refers to the ability of the agent to induce immune responses in the host. Agents may or may not induce long-term immunity against infection. For example, reinfection with the measles virus is thought to be rare, whereas repeated reinfection with gonococci bacteria is common.

HOST

In order to cause disease, pathogens must be able to enter the body, adhere to specific host cells, invade and colonize host tissues, and inflict damage on those tissues. Entrance into the host typically occurs through mucosal membranes or through wounds. Although some pathogens can grow at the initial entry site, most invade areas of the body where they are not typically found. The human body is capable of immune responses that reduce the likelihood that an agent will penetrate and cause disease. The host immune responses may be divided into specific and nonspecific. Specific immune mechanisms include humoral (antibodies) and cell-mediated immunity. Nonspecific host defenses require the presence of intact skin and mucous membranes, which provide barrier protection. The high pH of our gastric juices is lethal to many agents that manage to enter the body via ingestion. Tears and saliva can be thought as means to wash away would-be infectious agents. Several other factors influence the susceptibility and host response to an infectious agent. As we age, the ability of our nonspecific defense mechanisms to fend off agents may decrease. Immunocompromised individuals are more at risk to develop infectious disease than normal individuals. Genetic traits may result in reduced or enhanced susceptibility to infection and subsequent disease. For example, individuals who lack both Duffy blood group antigens are resistant to malaria caused by *Plasmodium vivax*, as these antigens are required for attachment of the agent. Individuals who have a homozygous 32 base pair deletion in the CCR5 gene have been found to resist HIV-1 infection, as CCR5 is a co-receptor used by HIV-1 for attachment and entry to the cell. The nutritional status and dietary habit of the host are also important. Malnutrition contributes significantly to infectious disease-related morbidity in developing countries.

ENVIRONMENT

The environment refers to the domain in which the disease-causing agent may originate, survive, or exit. This milieu has been categorized into three areas: physical, describing the geography and the climate; biologic, made up of plants, animals, and other life forms; and socioeconomic, which is the totality of the behavioral and attitudinal characteristics of a group of individuals. All these environmental categories have an impact on both microorganisms and potential hosts, as the environment may either enhance or diminish the survival of infectious agents and plays a major role in bringing microorganism and host into contact with each other. The environment may act as a reservoir or niche that fosters the survival of the infectious agent.

TRANSMISSION

Is the method by which an infectious agent passes from a source to the host. There are two general modes of disease transmission: direct and indirect. *Direct transmission* occurs through direct physical contact or direct person-to-person contact, such as touching with contaminated hands, kissing, or sexual intercourse. *Vertical transmission*—that is, the passage of the microorganism from mother to child—is considered a form of direct transmission.

Indirect transmission occurs when agents are transferred or carried by an intermediate source: vehicles, fomites, or vectors. Indirect transmission may be airborne (via droplets or dust particles), waterborne, vehicleborne, foodborne, or vectorborne. *Airborne transmission* occurs when a person sneezes, coughs, or talks, spraying microscopic pathogen-carrying droplets into the air that can be breathed in by nearby susceptible hosts (as occurs for the transmission of the influenza virus). Airborne transmission also occurs when droplets are carried through a building by heating

or air-conditioning ducts, or are spread by fans throughout a building or complex of buildings (as occurred for Legionnaire's disease). *Waterborne transmission* occurs when a pathogen is present in drinking water, swimming pools, streams, or lakes used for swimming (as in the examples of cholera and shigellosis). *Vehicleborne transmission* relates to fomites, such as eating utensils, clothing, washing items, combs, shared drinking bottles, and so on. *Foodborne* illness is transmitted by ingestion of contaminated food or drink. This type of transmission may be active if the organisms replicate while in the vehicle (such as salmonellae in food), or passive if the organisms are passively carried by the vehicle, as in the example of the hepatitis A virus in food. Some *vectorborne* disease transmission processes are simple mechanical processes, as when the pathogen uses a host (e.g., fly, flea, or rat) as a mechanism for a ride, for nourishment, or as a physical transfer process in order to spread. This is called *mechanical transmission*. When the pathogen undergoes changes as part of its life cycle within the host/vector and before being transmitted to the new host, it is called *biologic transmission*. An example of biologic transmission is that of the *Plasmodium* protozoan that completes its sexual development cycle in the female *Anopheles* mosquito.

PREVENTION AND CONTROL

Infectious diseases can be prevented or controlled at a variety of points, depending on the infectious cycle for the particular disease. Direct person-to-person transmission may be inhibited by proper hygiene and sanitary conditions as well as education. Vectorborne diseases may be prevented by control measures that either kill the vector or prevent its contact with humans. Infection by a pathogen or development of a pathogen within a host may be prevented by vaccination. Finally, drugs may be used to prevent infection or suppress the disease process.

—Franco Scinicariello

See also Acquired Immune Deficiency Syndrome (AIDS), Immune System

Further Reading and Reference

Centers for Disease Control and Prevention, http://www.cdc.gov/ncidod/index.htm

INFERTILITY

The majority of couples worldwide expect to have children, and few ever contemplate the possibility that they will be unable to do so. Yet at least 1 in 10 couples experiences difficulty in becoming pregnant, a stressor that can rank among the most emotionally taxing crises of adulthood.

WHAT IS INFERTILITY?

About one fourth of couples will conceive after 1 month of regular, unprotected sexual intercourse, and 80% are likely to conceive within 12 months. Couples are considered infertile if they are unable to conceive after 1 full year of unprotected sex. Couples who have never conceived are considered to have *primary infertility*, whereas couples who cannot conceive despite prior successful conception are defined as having *secondary infertility*.

The prevalence of infertility varies considerably across countries. In the United States, 10% to 14% of couples experience infertility, a rate that has been stable since 1965. Rates of infertility in developing countries tend to be higher, due in part to a greater prevalence of contributing infectious diseases. In some regions of sub-Saharan Africa, for example, rates of infertility have been reported to be as high as 30%.

WHAT CAUSES INFERTILITY?

The World Health Organization has estimated that less than half of infertility is attributable to inherent genetic and biological factors (e.g., anatomical or endocrinological abnormalities). More often, infertility is due to preventable factors, which include sexually transmitted and other infectious diseases, inadequate or unsafe health care, and harmful environmental substances.

Maternal age is an important determinant of fertility, and the tendency in Western countries for women to delay childbearing has likely contributed to the misperception that infertility is on the rise. Unlike men, whose decline in fertility is not thought to occur until age 50, and even then may be slight, women's fertility begins to decrease in the late 20s or early 30s, with a steeper drop after age 35. By age 40, approximately 1 in 3 women is likely to be infertile, and by age 45, only 1 in 10 women is likely to conceive.

Physiologically, this decline is explained by a gradually diminishing supply, and weakening quality, of oocytes (unfertilized eggs).

Although infertility has historically been perceived as a "women's problem," male factors are the specific cause of at least 20% of infertility cases and a contributing factor in another 30%. (Many cases of infertility are the result of multiple factors, and some, of course, are unexplained.) The most frequent basis for male infertility is an abnormality of sperm, in particular, oligospermia (low numbers of sperm), problems with sperm motility (movement), or irregular sperm morphology (shape). The precise reason for impairments in sperm production and function is often unclear, but genetic disorders, diseases, infections, environmental factors, and even nutrition are thought to play a role.

The most common physiological female factor contributing to infertility is infrequent or absent ovulation, implicated in up to one third of infertility cases. A primary cause of ovulatory dysfunction is polycystic ovarian syndrome, an endocrine disorder affecting at least 5% of U.S. women. Blocked or damaged fallopian tubes, often due to pelvic inflammatory disease or endometriosis, are another frequent cause of female infertility.

HOW IS INFERTILITY TREATED?

Infertility is often treated by reproductive endocrinologists, physicians with a specialization in obstetrics and gynecology who have completed advanced training and research in infertility. Treatment begins by testing both partners in order to determine the most likely cause or causes of infertility. Women with ovulatory problems are typically treated with *ovulation-inducing medication*, sometimes referred to as "fertility drugs." Two different classes of drugs may be used: clomiphene citrate, which is taken orally, or gonadotropins, which must be injected subcutaneously or intramuscularly. Clomiphene successfully induces ovulation in the majority of women for whom it is prescribed (estimates range from 60 to 90%); however, less than half will conceive within 6 months, the recommended maximum treatment period. When clomiphene is ineffective, the more expensive gonadotropins are used. Although gondadotropin injections are more likely than clomiphene to result in pregnancy, they also have more significant side effects, including a greater increase in the likelihood of multiple births.

Surgery is a second treatment approach. Women with fallopian tube blockages may benefit from surgical attempts to reopen or repair the tubes. Likewise, some male factor causes of infertility can be corrected by surgery. Finally, microsurgical procedures can be performed to reverse prior tubal ligation surgery in women as well as vasectomies in men.

Intrauterine insemination (IUI), in combination with fertility medications, is often the first intervention in cases of infertility caused by sperm abnormalities or infertility that is unexplained. This procedure involves collecting a semen sample from the male partner, removing and preparing the sperm, and then, by way of a thin catheter, placing the sperm directly in the woman's uterus. IUI must be carefully timed with ovulation to maximize effectiveness. Scientific studies of IUI success rates report pregnancy rates per cycle ranging from 4% to 15%. (In interpreting success rate statistics, keep in mind that a small percentage of technically "infertile" couples will conceive without any intervention—as many as 3% per cycle.) Because most couples attempt IUI up to six times, the overall pregnancy rate, across all attempts, is higher, with estimates ranging up to 25%. Several factors influence effectiveness, for example, maternal age, the number of ovarian follicles (sacs that contain the eggs) at the time of the IUI, and sperm motility.

Assisted reproductive technologies (ART) are defined by the Centers for Disease Control (CDC) as a group of therapies that involve the "handling" of both eggs and sperms. Although ART has received considerable attention from the media, less than 5% of infertile couples in the United States undergo ART, typically only after all other treatment options have been exhausted. It is also still a relatively new treatment, introduced in 1978. In general, ART involves stimulating a woman's ovaries, surgically removing her eggs, combining the eggs with a man's sperm, and then transferring any resulting fertilized eggs, or embryos, back to the woman's body.

By far the most commonly practiced type of ART is *in vitro fertilization* (IVF). "In vitro" comes from the Latin "in glass," referring to the laboratory dish in which the eggs and sperm are combined to facilitate fertilization; the embryos are then placed directly into the woman's uterus. *Gamete intrafallopian transfer* (GIFT) is similar to IVF except that the woman's eggs are transferred to her fallopian tubes and fertilized there, rather than outside her body. A third type of ART is *zygote intrafallopian transfer* (ZIFT), which

combines laboratory fertilization of a woman's eggs with embryo transfer to the fallopian tubes. ART procedures tend to be expensive, and, in the United States, the cost is only rarely covered by health insurance.

The CDC collects data from fertility clinics in the United States each year in order to track the effectiveness of ART. Among 384 clinics that provided data in 2001, 33% of ART cycles that used fresh, nondonor eggs resulted in a pregnancy. Success rates decline as maternal age increases; the likelihood of pregnancy in women over 40 was 23%. The success of ART has gradually increased over time, helped in part by the introduction of intracytoplasmic sperm injection (ICSI) in 1992, a technique that allows a single sperm to be directly injected into an egg, thereby increasing the chance that fertilization will occur.

Third party reproductive techniques refer to the donation of eggs, sperm, or embryos to infertile couples. Donors may be acquainted with the couple or anonymous. Surrogacy, the carrying of an embryo throughout pregnancy by another woman, is also considered a third party reproductive technique. As noted by the American Society for Reproductive Medicine, third party techniques present significant psychological, ethical, and legal issues and, with the exception of sperm donation, are still quite new approaches to the treatment of infertility.

HOW DOES INFERTILITY AFFECT MENTAL HEALTH?

The experience of infertility, as well as its treatment, can be profoundly distressing. For nearly one half of women who undergo IVF, infertility is seen as the worst experience of their lives. Studies based on descriptive interviews with infertile couples reveal many emotional consequences, including feelings of loss of control, a lowered sense of personal competence, perceptions of alienation and hopelessness, and a sense of social stigma. For some couples, infertility is viewed as a strain on their relationship, although other couples report that the jointly experienced stressor of infertility serves to bring them closer. In addition, couples, and particularly women, find themselves immersed in the treatment process, and the invasive nature of infertility therapy exerts additional stress.

Empirical investigations of the impact of infertility have demonstrated that infertile couples tend to experience greater anxiety, depression, and self-esteem than their peers, and a subset of couples are at risk of developing clinically significant mental health problems. Women tend to struggle more than men and consequently are more apt to avoid day-to-day reminders such as contact with babies and pregnant women. Women are also more likely than men to seek out information about infertility, initiate treatment, and desire to continue treatment.

Although psychological studies in this area are far from perfect, experiences of infertile individuals who have opted to undergo medical treatment clearly indicate that, overall, infertility is a highly disruptive life crisis. Consequently, many infertility practices employ mental health professionals who can address emotional aspects of infertility with clients. In addition, many infertility patients have found comfort in support groups, national infertility organizations, and Internet chatrooms and newsgroups.

—Melissa Himelein

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INFORMATION PROCESSING THEORY

Information processing theories explain how people work with or perform mental operations on information they have received. These operations include all mental activities that involve noticing, taking in, manipulating, storing, combining, or retrieving information. This approach to human development emphasizes the fundamental mental processes involved in attention, perception, memory, decision making, and reasoning. Basically, information processing theory attempts to explain how humans think. Prior to the evolution of information processing theory, the field of psychology was dominated by behaviorism, a school of thought in which emphasis was placed solely on externally observable behaviors. Because mental processes were not directly observable, they were not a concern among behaviorists. Cognitivists representing a contrasting theoretical school based on cognition, on the other hand, postulated that internal cognitive processes serve as the basis for understanding many human behaviors and that these cognitive processes could be understood by analyzing the ways in which people think. Consequently, in the late 1950s, cognitivists suggested that behaviorists' explanations of behavior were inadequate because they did not account for human thought processes. As a result, an upsurge in theories resulted that detailed models of human thinking and problem solving. Cognitivist models typically placed an emphasis on serial, or step-by-step, processing of information and adopted the computer as a model of human cognitive activity.

THEORIES OF INFORMATION PROCESSING

In 1956 George A. Miller was among the first to apply a step-by-step theory to information processing by relating it to the way that high-speed computers processed information. He proposed that, similar to a computer, the human mind takes in information, performs operations on it to change its form and content, stores and locates the information, and then generates output of some type. According to Miller's theory, information processing in humans involves gathering and representing information (encoding), holding information (retention), and getting at the information when necessary (retrieval). In addition to comparing information processing of humans to that of computers, Miller made a significant contribution to the understanding of information processing with his concept of chunking as related to short-term memory. He proposed that individuals could only store five to nine chunks, or meaningful units, of information in their short-term memory. Anything from digits to words to people's faces were considered to be chunks of information. The concept of chunking was one of Miller's major contributions, because it became a basic element of later theories of memory.

A later development, the *three-stage information processing model*, is now perhaps the most accepted model among information processing theorists. This model was first developed by Atkinson and Shiffrin in 1968 (referred to as the Atkinson-Shiffrin model). This model was then modified by others, including Loftus and Loftus, producing various versions. Generally, this model proposes that there are three stages involved in memory: input or sensory registry, short-term memory, and long-term memory. Sensory registry involves input from sight and sound and processing at this level occurs in 3 to 5 seconds. During the short-term memory stage, information is transferred to short-term memory, where it can remain for 15 to 20 seconds. Typically, five to nine chunks of information can be recalled from short-term memory. Short-term memory capacity can be increased by chunking information into manageable units or by rehearsing information until it is committed to memory. During the third and final stage, information for future reference is stored in long-term memory, which is thought to have an unlimited capacity.

In addition to the three stage information processing model, there are three more models that have been widely adopted. The first, *levels of processing theory*, is based on the work of Craik and Lockhart in 1972. The major premise behind this theory is that people use different levels of elaboration as they process information during the learning process. Elaboration involves taking simple information and applying meaning to it in a way that increases the chance of remembering that information. Different levels of processing or elaboration can make it easier for an

individual to retrieve a piece of information that is stored in memory.

The two remaining models have been labeled the *parallel-distributed processing model* and the *connectionistic model*. These models were proposed as alternatives to the three stage model. According to the parallel-distributed processing model, information is processed by several distinct parts of the memory system in a simultaneous fashion. This is different from the three stage model because it proposes a simultaneous process, as opposed to the step-by-step process proposed by Atkinson and Shiffrin.

The connectionistic model was proposed in 1986 by Rumelhart and McClelland. This model assumes that bits of information are stored in numerous locations throughout the brain in the form of networks or connections. According to this model, the more connections there are to a single concept or bit of information, the more likely that concept is to be remembered. For example, according to this theory and its supporting research, trying to find your keys after misplacing them can be difficult if you cannot remember where you were the last time you saw them. If you *can* remember where you were the last time you saw them *and* you can also remember at least three places you went after you last saw them, you may be more likely to find your keys.

DEVELOPMENTAL ISSUES

Some information processing theorists suggest that children differ from adults primarily because they have had less experience. These theorists believe that, with proper training or education, children can learn to succeed at various cognitive tasks. Thus, exposure to the environment affects cognitive development. Other theorists believe that children's natural maturation processes influence the complexity of their thinking. Therefore, as children grow older and naturally mature, they are able to perform cognitive tasks of increasing difficulty and complexity. Information processing theorists assume that development involves qualitative and quantitative changes. Examples of these changes have been seen in children's performance in several domains. These include perception, memory, verbal comprehension, mathematical skills, problem solving, and reasoning.

With regard to perception, studies have shown that young children have trouble distinguishing between appearance and reality. That is, when asked to describe something, young children will describe the way it appears to them, rather than what is really in front of them. Memory has been found to be better in older children than in younger children. When learning new material, young children are likely to use very simple strategies, while older children employ more elaborative strategies to aid in memorizing information.

Verbal comprehension is the ability to comprehend words, sentences, paragraphs, and other forms of spoken information. Children's verbal comprehension appears to increase with age. The ability of children to generate useful strategies that improve verbal comprehension also increases with age.

These findings indicate that, as humans get older, there is a trend for us to develop more sophisticated ways of acquiring, processing, and retaining information. Thus, information processing skills become more developed with age. This aspect of change implies that, when teaching children new things, it is important to consider where they are in the developmental process and to adjust teaching techniques so that they are compatible with children's information processing capabilities.

INFORMATION PROCESSING RESEARCH METHODS

In the late 1980s, David Klahr characterized information processing research as falling along a continuum ranging from "soft-core" to "hard-core" approaches. Soft-core research involves describing a child's processing of information as a flow diagram or in some way that is not as complex or formal as a computer program. Hard-core approaches, on the other end of the spectrum, involve writing computer programs that imitate a child's output as that child processes information. A program that successfully matches the child's output is considered to be a theory of how the child's mind operates.

The first computer simulation program used to understand information processing was developed by Allen Newell and Herbert Simon in the late 1960s and early 1970s. This program, originally called the *Logic Theorist* and later termed the *General Problem Solver*, was essentially a theory of human problem solving stated in the form of a simulation program. This theory was tested by comparing the results of the computer simulation with human behavior in a given task.

The information processing approach has gained considerable popularity in recent years. Nevertheless, weaknesses in this approach have been noted. A primary weakness is that there is no guarantee that flow

diagrams or computer programs that predict behavior actually represent the way human cognitive processes really work. There may be reason to believe that the differences between computers and the human mind far outweigh the similarities. Furthermore, because information processing studies are conducted in highly controlled laboratory settings, such findings may be unequal to results that would result from studying children in their natural environments.

—Danielle Rosnov and Michael C. Roberts

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INHIBITORY CONTROL

Broadly speaking, inhibitory control is the ability to suppress the activation, processing, or expression of information that would otherwise interfere with the efficient attainment of a cognitive or behavioral goal. Everyday examples of inhibitory control include a student who must ignore the conversations of her siblings while she is trying to study for an exam, a baseball player who starts to swing at a pitched ball but then attempts to stop his swing, and a small child who must ignore all of the extra visual information when he is searching for Waldo in his *Where's Waldo* book. Given the countless sources of interference encountered on a moment-by-moment basis, intact inhibitory control is essential for navigating and effectively interacting with the environment.

Although inhibitory control involves many regions of the brain, past research suggests that one particular region, the prefrontal cortex (PFC), plays an essential role in the mediation of inhibitory control. Evidence from studies such as the one conducted by D. Guitton and colleagues supports this notion. The researchers administered a task designed to measure inhibitory control to three groups of individuals: people who had previously experienced injury to the PFC, people who had previously experienced injury to parts of their brain other than the PFC, and people who had no history of brain injury. The researchers found that people with PFC damage performed more poorly on the inhibitory task than the other two groups. This finding supports the notion that the PFC is very important for efficient inhibitory control.

Additional support for the role of the PFC in inhibitory control is evident in the early development literature. Specifically, the emergence of proficient inhibitory control during childhood parallels the maturation of the PFC. The PFC and its connections with other brain regions are the last brain structures to reach maturity. Whereas most other regions of the brain reach adult-like levels of development by 12 years of age, the PFC continues to mature for several additional years. A similar pattern of improvement is observed on tasks requiring inhibitory control well into young adulthood.

The importance of the PFC in the development of inhibitory control is further underscored by the fact that inhibitory deficits have been observed in a range of childhood disorders, including attention deficit/hyperactivity disorder, Tourette's syndrome, obsessive-compulsive disorder, and childhood-onset schizophrenia. Although the specific etiology of each of these disorders is unclear, in each instance it is believed that damage occurs during PFC development, and abnormal neural activity in the PFC and/or structural PFC abnormalities have been observed for individuals with each disorder.

Present research efforts are focused on several topics related to inhibitory control. For example, work is currently underway investigating the relationship between inhibitory control and other cognitive abilities such as working memory and processing speed (how fast your brain can process information). Understanding the interplay between abilities like these and learning how each of these abilities develops can provide invaluable insight into the overall intellectual development of humans throughout childhood. Other researchers are exploring the possibility that several different subtypes of inhibitory control may

exist. Using a combination of behavioral and neuroimaging studies, researcher B. J. Casey has taken a lead in this area of study. She has recently proposed that five different subtypes of inhibitory control may exist, with each type being supported by a different brain pathway. While Casey's model remains speculative at this time, it provides a nice starting point for future research in the area of inhibitory control.

—Shawn E. Christ

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INJURIES

Injuries have a significant impact on development beginning in infancy, reaching a peak during the adolescent and young adult years, but persisting in importance throughout the life span. Most experts no longer use the term "accidents," when referring to these events. Based on its Latin roots, accident refers to an event that happens unexpectedly or by chance. As scientists and others have studied this problem over the past 50 years, it has become clear that many of these events do not occur by chance, but are predictable, based on the individual and environmental circumstances.

William Haddon, a physician/scientist, built upon the wealth of injury research stemming from World War II to describe a framework that has become central to understanding the causes and consequences of injuries. Haddon recognized that a phenomenon common to most injuries is the transfer of energy—thermal, radiant, chemical, electrical, and mechanical—in amounts that are too great or at rates that are too high for the body to absorb, hence an injury results. For example, when a motor vehicle collides with a tree or a streetlamp, the mechanical/kinetic energy of the vehicle is transferred to the driver or passengers, causing an injury such as a fractured arm or head trauma. The faster a car is going, the more energy it transfers in a collision. A safety belt or airbag absorbs much of that energy, decreasing the severity of injury. Another example would be a burn. When a child exploring a sink or tub turns on the hot water, the temperature setting may be so high that the transfer of that heat energy to the child's hand or face results in a scald. Interestingly, the absence or lack of energy can also result in an injury. Many poisons, for example, act by disrupting the normal biochemical processes in the body.

In order to understand these transfers of energy with a view toward preventing injuries, Haddon created a two-dimensional matrix (Table 1). One dimension consists of the characteristics of individuals, their environments, and the particular type of energy or agent in question. Individual characteristics include age, developmental stage, physical or mental disabilities, and gender. One individual characteristic that has been the source of much debate is "injury proneness." Although studies have examined aggressiveness, hyperactivity, and other behavioral characteristics with a view toward defining "proneness," conclusions are inconsistent. Environments consist of the physical and social circumstances in which individuals find themselves. For example, an elderly woman, already at risk of hip fracture by virtue of her age, would have a much higher risk in an icy, wintry climate compared to a warmer climate. The energy or agent is specific to a particular injury. For example, roadways, sites of motor vehicle crashes, could have well-designed shoulders, improved lighting, proper grading and curves and many other environmental alterations to decrease injuries, even if the driver of a motor vehicle loses control for some reason. The second dimension reflects three stages in the timing of the transfer of energy—pre-event, event, and postevent. For example, the speed of a motor vehicle, combined with its size or mass, generates energy as it cruises along a road, prior to a crash (the pre-event phase). When a crash occurs, the energy is transferred to the driver and passengers (event phase). In the postevent phase, the effects of the transfer of energy can be lessened by appropriate emergency care and rehabilitation.

Understanding the interaction among the agent, host, and environments is key to injury prevention.

Table 1 Haddon Matrix to Consider Ways to Decrease the Risk of Motor Vehicle Injuries for Teenage Drivers

	Host	*Agent/Vehicle*	*Physical Environment*	*Social Environment*
Pre-event	Provide training about safe driving behaviors through programs such as Graduated Driver Licensing	Assure that safety belts and airbags are in working order	Improve the quality of safety devices such as road lighting and road grading	Help teens understand the role of risk-taking and the impact of peers on their behavior
Event	Provide training for situations such as unexpectedly driving on a shoulder, necessitating a careful return to the road	Encourage the use of heavier and safer motor vehicles that are better able to absorb the energy transferred in a crash	Improve the design of highways so that when a crash occurs, a secondary or rebound crash is avoided	Create strong norms against the use of alcohol while driving, because alcohol increases the risk of injury, controlling for crash severity
Post-event	Provide training about access to emergency services	Design cars with sturdy fuel tanks to decrease the risk of fire when involved in a crash	Facilitate physical access for emergency vehicles	Support community emergency medical services

From a developmental perspective, strategies that minimize the need for individual actions are more effective in preventing injuries than strategies that expect individuals to act repeatedly. For example, passive restraints such as automatic safety belts and airbags are more effective than restraints that depend on individual behavior each time one enters a motor vehicle. Installing energy-absorbing materials on playgrounds is more effective than expecting parents to maintain constant vigilance as their children explore climbing equipment and develop new skills.

Within the overall problem of injuries, there are two major categories—unintentional and intentional. Intentional injuries refer to willful, deliberate actions that result in harm. Homicides represent intentional injuries in which one individual willfully attempts to kill or harm another individual. Suicides represent intentional injuries in which an individual attempts or succeeds in harming himself or herself. Unintentional injuries refer to those events that occur without a willful goal to do injury or harm. Most of what have commonly been referred to as "accidents" are unintentional injuries. The focus of this entry is unintentional injuries. Homicide and suicide are covered in other entries.

OVERVIEW OF INJURIES ACROSS THE LIFE SPAN

There are many indicators to describe the outcomes of injuries. Because deaths are a basic component of public systems of vital statistics (i.e., deaths, births, marriages, divorces), deaths due to injuries are a commonly used indicator of the injury problem. Each year, there are approximately 100,000 deaths due to unintentional injuries in the United States—overall, a relatively small fraction of the more than 2.4 million deaths that occur. Looked at in alternative ways, however, injuries represent a significant health event for many ages. For example, about 27 million individuals visit an emergency department for an injury each year, representing just less than 10% of the entire population. Further, as shown in Table 2, after the first year of life, unintentional injuries are the leading cause of death through the young adult years. While injuries decline in rank after the age of 35, more than 36,000 adults between the ages of 35 and 64 die of injuries each year. It is only after the age of 45 that unintentional injuries begin to decline in importance as a cause of death compared to heart disease, cancer, and other chronic diseases. Other

Table 2 Ten Leading Causes of Death (All Races, Both Sexes)

	Age Groups						
Rank	***<1***	***1–4***	***5–14***	***15–24***	***25–34***	***35–64***	***65+***
1	Congenital Anomalies 5,513	Unintentional Injury 1,714	Unintentional Injury 2,836	Unintentional Injury 14,411	Unintentional Injury 11,839	Malignant Neoplasms 156,354	Heart Disease 582,730
2	Short Gestation 4,410	Congenital Anomalies 557	Malignant Neoplasms 1,008	Homicide 5,297	Homicide 5,204	Heart Disease 112,211	Malignant Neoplasms 390,214
3	SIDS 2,234	Malignant Neoplasms 420	Congenital Anomalies 376	Suicide 3,971	Suicide 5,070	Unintentional Injury 36,947	Cerebrovascular 144,486
4	Maternal Pregnancy Comp. 1,499	Homicide 415	Homicide 326	Malignant Neoplasms 1,704	Malignant Neoplasms 3,994	Cerebrovascular 18,009	Chronic Low Respiratory Disease 106,904
5	Placenta Cord Membranes 1,018	Heart Disease 225	Suicide 272 Heart Disease 272	Heart Disease 999	Heart Disease 3,160	Diabetes Mellitus 16,871	Influenza & Pneumonia 55,518
6	Respiratory Distress 1,011	Influenza & Pneumonia 112	Homicide 189	Congenital Anomalies 505	HIV 2,101	Liver Disease 16,345	Diabetes Mellitus 53,707
7	Unintentional Injury 976	Septicemia 108	Benign Neoplasms 105	HIV 225	Cerebrovascular 601	Suicide 15,894	Alzheimer's Disease 53,245
8	Bacterial Sepsis 696	Perinatal Period 72	Chronic Low Respiratory Disease 104	Cerebrovascular 196	Diabetes Mellitus 595	Chronic Low Respiratory Disease 14,490	Nephritis 33,121
9	Circulatory System Disease 622	Benign Neoplasms 58	Influenza & Pneumonia 92	Influenza & Pneumonia 181	Congenital Anomalies 458	HIV 9,987	Unintentional Injury 32,694
10	Intrauterine Hypoxia 534	Cerebrovascular 54	Cerebrovascular 80	Chronic Low Respiratory Disease 171	Liver Disease 387	Homicide 6,735	Septicemia 25,418

SOURCE: National Center for Health Statistics Vital Statistics System (1999).

indicators of injuries include rates of hospitalization, visits to emergency departments, visits to physicians/clinics, and reports from individuals in community surveys about injuries that did not require contact with the health system. Table 3 shows that, of all injuries, falls are the leading cause of visits to hospital emergency departments across the age spectrum, except for adolescents and young adults. In general, deaths due to injuries represent just a small piece of the picture, with 40 to 50 hospitalizations

Table 3 Leading Causes of Nonfatal Injuries (All Races, Both Sexes)

	Age Groups						
Rank	***<1***	***1–4***	***5–14***	***15–24***	***25–34***	***35–64***	***65+***
1	Unintentional Fall 122,276	Unintentional Fall 865,209	Unintentional Fall 1,349,004	Unintentional Struck by/Against 973,073	Unintentional Fall 754,691	Unintentional Fall 2,115,608	Unintentional Fall 1,822,157
2	Unintentional Struck by/Against 33,132	Unintentional Struck by/Against 364,168	Unintentional Struck by/Against 1,004,881	Unintentional MV-Occupant 916,330	Unintentional Overexertion 694,464	Unintentional Overexertion 1,287,122	Unintentional Struck by/Against 194,435
3	Unintentional Fire/Burn 11,306	Unintentional Other Bite/Sting 134,964	Unintentional Overexertion 354,227	Unintentional Fall 866,078	Unintentional Struck by/Against 675,770	Unintentional Struck by/Against 1,176,561	Unintentional MV-Occupant 188,278
4	Unintentional Other Bite/Sting 11,141	Unintentional Foreign Body 108,037	Unintentional Cut/Pierce 283,361	Unintentional Overexertion 746,386	Unintentional MV-Occupant 629,739	Unintentional MV-Occupant 1,060,137	Unintentional Overexertion 168,995
5	Unintentional Cut/Pierce 7,731	Unintentional Cut/Pierce 85,140	Unintentional Pedal Cyclist 254,765	Unintentional Cut/Pierce 493,032	Unintentional Cut/Pierce 441,956	Unintentional Cut/Pierce 807,537	Unintentional Cut/Pierce 116,915
6	Unintentional MV-Occupant 7,713	Unintentional Overexertion 67,227	Unintentional MV-Occupant 180,262	Other Assault Struck by/Against 436,395	Other Assault Struck by/Against 270,689	Unintentional Other Specified 368,101	Unintentional Other Bite/Sting 77,191
7	Unintentional Foreign Body 7,465	Unintentional Poisoning 62,661	Unintentional Other Bite/Sting 154,588	Unintentional Other Bite/Sting 164,502	Unintentional Other Bite/Sting 141,176	Other Assault Struck by/Against 319,477	Unintentional Poisoning 46,581
8	Unintentional Poisoning 6,095	Unintentional Fire/Burn 58,931	Unintentional Unknown/ Unspecified 117,463	Unintentional Unknown/ Unspecified 164,325	Unintentional Other Specified 138,591	Unintentional Other Bite/Sting 314,887	Unintentional Other Transport 46,507
9	Unintentional Overexertion 5,975	Unintentional Unknown/ Unspecified 50,343	Other Assault Struck by/Against 116,873	Unintentional Other Specified 148,112	Unintentional Other Transport 102,373	Unintentional Poisoning 227,537	Unintentional Unknown/ Unspecified 45,837
10	Unintentional Unknown/ Unspecified 5,703	Unintentional MV-Occupant 43,495	Unintentional Other Transport 116,699	Unintentional Other Transport 137,327	Unintentional Unknown/ Unspecified 97,096	Unintentional Other Transport 95,878	Unintentional Other Specified 36,156

SOURCE: U.S. Consumer Product Safety Commission, NEISS All Injury Program (2003).

and more than 1,000 emergency department visits for every death.

Although Tables 2 and 3 provide an overall picture of injuries, it is important to point out that males are at greater risk of injury for virtually every type of injury, throughout the course of life. Physical, psychological, and cultural factors all may play a role in this increased risk for males.

ALCOHOL

Any review of the issue of injuries must consider the role of alcohol. Alcohol has profound and subtle effects on the physical, cognitive, and social characteristics of individuals, so it is not surprising that use of alcohol is one of the most important injury risk factors. In 2000, the per capita consumption of alcohol was estimated at nearly 290 cans of beer, 60 glasses of wine, and 133 shots of spirits. Although consumption of alcohol is widespread, it is calculated that about 10% of the population is responsible for 50% of alcohol use. Decreasing the use of alcohol would be one of the most effective strategies to decrease the toll that injuries take on health. Alcohol is associated with over 30% of fatal motor vehicle crashes, accounting for nearly 13,000 of the 42,000 traffic-related fatalities in 2000. Adults between the ages of 25 and 44 are at greatest risk for alcohol-related motor vehicle deaths, with 44% of traffic fatalities involving alcohol. For 16- to 24-year-olds, alcohol is involved in 30% of fatalities in contrast to only 4.7% for those older than age 65. It is noteworthy that many motor vehicle deaths for teens involve alcohol, even though every state prohibits alcohol consumption younger than age 21. Even for children, alcohol represents a substantial risk for motor vehicle–related deaths. Annually, of the approximately 2,800 children under the age of 16 who die in motor vehicle–related events, 20% involve drinking drivers. About 60% of the deaths involve children as passengers in cars and the other 40% involve them as pedestrians or bicyclists. For the children who die as passengers in alcohol-related crashes, more than two thirds are in cars in which their own driver had been drinking alcohol. Alcohol has also been associated with other injuries. For example, burns and smoke-related injuries and deaths from fires, especially in homes, often involve alcohol. Similarly, the risk of falls, the leading cause of hospitalization for injuries, is understandably increased by alcohol consumption. Alcohol is associated with a significant proportion of drownings. Given the important role that alcohol consumption plays in injury-related deaths and disabilities, policy efforts to control alcohol are key to reducing injuries.

INFANTS AND TODDLERS

The interaction among host and environmental characteristics of infants is unique and complicated. Infants begin their lives entirely dependent on the behaviors and actions of their parents or other caretakers with regard to the relationship to their environments. As they develop during the first year, however, two changes take place. First, as their brains and neuromuscular systems develop, infants are able to exert more control over their behavior. Second, parents must learn to become more attentive to these newly emerging capabilities. The interaction between these two phenomena explains why unintentional falls are the leading cause of nonfatal injuries for this age group. Falls from changing tables, for example, may result from the newly emerging and perhaps first expression of the ability to roll over combined with a momentary distraction by a parent as they reach for a diaper. Agran and colleagues actually looked more precisely at the relationship between development and injury hospitalization by examining rates in 3-month intervals, rather than the usual 1-year or several-year age categories. They found, for example, that indeed the risk for injury rises markedly between 9 and 11 months. Rapid and complex developmental processes are associated with a variety of injuries beyond the first year of age. Agran reported that for children under 4, injury rates peaked at 15 to 17 months. The types of falls varied greatly, again reflecting the different exposures that are associated with increasing physical and developmental capacities. Falls from stairs were prominent for the youngest children, giving way to falls from playground equipment as they moved into this new environment. Poisoning due to medications was the greatest risk at 21 to 23 months before declining in importance.

Even for infants and toddlers the overall risk of injury differs markedly between boys and girls.

YOUNG CHILDREN

The beginning of school represents a developmental milestone that is accompanied by its share of injury risks. Motor vehicle injuries are the leading injury, but especially between the ages of 5 and 14, pedestrian injuries represent a significant risk. Recent data show that the pedestrian death rate for 5- to 9-year-olds was

1.36 compared to 1.85 for motor vehicle occupants. For 10- to 14-year-olds the rates were 1.23 and 2.80, respectively. Children of this age are only beginning to develop the ability to judge the distance and speed of a moving vehicle. In addition, these children are likely to dart into the traffic, even if they happen to be at an appropriate safety crossing.

Several prevention strategies have had remarkable impacts on injury deaths and disabilities for children. Each of these strategies is designed around an understanding of the physical and developmental characteristics of this age group. For example, the design of child safety seats recognizes the need to restrain children in ways that are both secure, comfortable, and, for parents, convenient. When used correctly, safety seats reduce the risk of death and serious injury by 70%. Since the implementation of the first child safety seat law in Tennessee in 1978, hundreds of children have been spared death or serious injury in motor vehicle crashes. Recently, many states have passed laws requiring booster seats for children up to 80 pounds out of recognition that adult safety belts do not adequately correspond to the anatomic characteristics of children. The Poison Prevention Packing Act of 1970 regulates access to containers and other features of hazardous substances, building upon an understanding of the exploring behaviors of toddlers and young children coupled with the difficulty that parents and other caretakers have in vigilantly monitoring these youngsters. Fencing for swimming pools, requirements that children wear bike helmets, regulation of hot water heater temperatures, and other interventions are most effective when they take into account the developmental stages of those children most at risk.

ADOLESCENTS

The collision of the developmental tasks of adolescents with their physical and social environments makes it possible to understand the high rates of injury death and disability in this age group. Establishing autonomy, becoming comfortable with pubertal changes, building relationships outside the family, and developing abstract reasoning abilities all combine to increase the risk of injuries. In contrast to school age and early adolescence, where the injury-related death rate is about 8.9 per 100,000 population, the rate markedly increases to nearly 40 per 100,000 for 15- to 24-year-olds, and then begins to decline.

Driving is perhaps the most important symbol of adolescence. The use of a motor vehicle gives expression to growing feelings of independence and facilitates interactions with new friends and groups. Motor vehicles, with their capacity to generate and thus transfer huge amounts of energy, create a challenge in view of the rapid and sometimes intense physiological and psychological developments for adolescents.

The National Youth Risk Behavior Survey (YRBS) is a school-based, nationally representative survey of over 15,200 students in grades 9 through 12. The YRBS identifies many behaviors that reflect how adolescent development increases the risks of injury. Nationally, over 18% of students had rarely or never worn seat belts when riding in a car. During the 30 days preceding the survey, 30% of students had ridden with a driver who had consumed alcohol and 12% had themselves driven after drinking alcohol.

Given the complex interaction between the driver, the motor vehicle, and the external environment, adolescents, and particularly new drivers, are especially at risk. Safe driving requires a level of maturity that is heavily dependent on time as well as experience with the multiple and frequently changing circumstances that drivers encounter. Motor vehicle crashes account for nearly 40% of all deaths for 15- to 19-year-olds, over 2,600 deaths per year. Sixteen-year-old drivers are involved in 42 crashes per million miles driven compared to 30 and 15 for 17- and 18-year-olds, respectively. Approximately 25% of 16-year-olds are involved in a crash in any given year.

In order to address the risk of death and injury for new drivers, over 40 states have adopted graduated driver license (GDL) programs, interventions that reflect the developmental needs of adolescents. Basically, GDL places restrictions on new young drivers and gradually removes those restrictions as they gain maturity and experience. For example, in North Carolina, individuals obtain a Level 1 permit at the age of 15 that allows them to drive as long as there is an adult supervisor in the front seat with them. For the first 6 months, the new driver is restricted to the hours of 5 a.m. to 9 p.m., to gain important experience during the more forgiving driving conditions of daylight, before being exposed to driving during the nighttime hours. After 1 year of supervised driving, new young drivers are permitted to drive by themselves, but only until 9 p.m. for 6 months. In addition, during this 6-month period of newly unsupervised driving, only one passenger is permitted, because for 16-year-olds, two passengers more than double the risk of a crash, and three passengers increase the risk by nearly fivefold. GDL programs, incorporating an understanding of adolescent

development, have had remarkable effects, such as a 25% reduction in deaths for 16-year-old drivers.

ADULTS

During adulthood, the death rate due to unintentional injuries remains relatively stable at around 30 to 32 per 100,000 population, with motor vehicle injuries accounting for at least half of these deaths. After the age of 35 years, injuries fall to second behind cancer as a cause of death.

The workplace is obviously an important environment to consider in describing injuries during the productive adult years. For younger adults (20–34 years), workplace fatalities average 1,760 per year (3.9 per 100,000 population), while for adults 35 through 54, the rate increases to 4.5. Approximately 18% to 19% of these deaths are associated with assaults (intentional injuries). Reflecting the contribution of motor vehicle injuries to overall mortality, transportation incidents account for 40% of occupational deaths. Untoward encounters with equipment or other objects is responsible for the next most frequent cause of occupational death at 16%, with falls and exposures to harmful substances accounting for 9 to 12% of fatalities. Not surprisingly, the risks vary greatly by industry. Agriculture, forestry, and fishing have reported about 800 deaths per year in recent years for a rate of about 23.8 per 100,000, followed by mining with 150 deaths per year with a rate that has varied between 21.7 and 27.0 over the past several years. At the other end of the spectrum, finance, insurance, and real estate has experienced around 100 deaths per year at a rate of 1.2 per 100,000 population.

AGE 65 AND BEYOND

The interaction between host and environmental characteristics results in particular risks for injuries among this age group. Physical characteristics include changes in vision, losses in strength, coordination and response times, and changes in bone density with increasing fragility. In addition to these developmental changes, many medications for hypertension, heart disease, and other chronic diseases may impede normal strength and reflexes. Complementing these changes in the elderly individual as the host are environmental characteristics. The problem is not changes in environments per se, but rather the failure to attend to safety hazards in the home or other locations. Climbing into a tub poses a minimal risk for a 40-year-old, but may create a sizable hazard for a 70-year-old. At night, the same darkened hallway that for years was second nature becomes a hazard as physical skills diminish. The ability to negotiate the complicated environmental interactions of driving is dependent on physical and cognitive skills that are in decline.

Injuries constitute only a fraction of deaths for seniors. For those between the ages of 65 and 74, the death rate is only 47 per 100,000 compared to 860 and 776 for cancer and heart disease, respectively. Beyond the age of 75, the differences in rates are even more dramatic. The mortality rate for injuries does increase to 146 per 100,000 population, but the rates for heart disease (3,100 per 100,000) and cancer (1,462 per 100,000) overshadow that rate.

In spite of the relative decline in importance of injuries in the later years, recognition of the physical and cognitive needs of elderly individuals can decrease the risks of disability and death. Regular health visits allow assessment of the capacities of elderly patients. Such visits should evaluate vision, balance, strength, and use of pharmaceuticals for other chronic diseases. Weight-training and other exercises, for example, may improve strength and gait. Screening for osteoporosis may identify those in need of attention to weakening bones, a risk factor for falls and fractures. Health care providers or indeed anyone who interacts regularly with the elderly should inquire about their physical environments as well, as a way to address injuries. Improvements in lighting, attention to potential obstacles, creation of nonslip surfaces, handles in tubs and showers, and many other interventions may decrease the risk of injury for individuals with physical impairments. Transportation, in particular, is a challenge. Safe driver programs for the elderly are an important approach. Development of alternatives for elderly individuals who drive themselves is a growing need as the overall population ages.

SUMMARY

Injuries are a prominent health and behavioral outcome throughout the life span, becoming the leading cause of death after the first year and remaining the leading cause until well into adulthood. Even when injuries decline in rank, they are the source of death and disability for a large segment of the population. Perhaps the most significant aspect of injuries is that most of them are preventable with attention to the characteristics of individuals and their interactions with their physical and social environments. Deaths due to motor vehicle injuries, the leading cause, have declined by 38% during the past 50 years. This decline has resulted from interventions that are based on an

understanding of the mechanisms of injuries as informed by the Haddon matrix combined with the political will and resources to effect environmental changes. In addition, interventions have enabled individuals to become more aware of the important role that they play in their interaction with environments. Across all causes of injuries, amelioration of individual and environmental risk factors has been associated with thousands of averted deaths and hundreds of thousands of cases of averted disability and distress. Given the ability to understand the factors associated with injuries, further substantial progress in reducing this cause of distress is desirable and feasible.

—Lewis Margolis

See also Firearms, Infant Mortality, Violence

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INTELLECTUAL DECLINE

Many adults believe that their thinking and memory skills are getting poorer, or will become so, as they grow older. Older adults frequently report that their memory is "not as good as it used to be," and some may avoid participating in adult education or workplace training because they believe that "you can't teach an old dog new tricks." While scientific evidence shows that some intellectual skills may decline in old age, these declines are neither inevitable or universal and not as profound as popular beliefs suggest.

For many years, cognitive psychologists studying intellectual functioning believed that cognitive skills begin to deteriorate by middle adulthood and decline markedly in old age. During World War I, the U.S. Army began testing inductees' intellectual abilities to determine the kinds of military work for which they would be suited. Intellectual abilities were shown to peak in early adulthood and then decline systematically with age and type of skill measured. Verbal abilities showed the least decline, and numerical and reasoning skills suffered the greatest losses.

Results from early intellectual aging studies were based on cross-sectional samples of individuals of different ages, such as 20- versus 40- versus 60-year-old adults. Such studies do not show how intelligence changes *within* individuals over time: Age changes are confounded with age differences, giving a misleading picture of intellectual decline. Because older adults typically have had less education, and are not well practiced in test-taking compared to younger adults, they tend to look less intelligent.

When longitudinal data became available, a different picture of intellectual changes began to emerge. Longitudinal studies follow individuals over a lengthy period of time—several years or decades—and measure their intellectual abilities every few years. For example, one study retested 50-year-old men who had taken the Army Alpha Test during WWI. These men were found to have higher IQ scores, on average, than when they were 19 years old. A second follow-up showed that they had maintained these abilities into their 60s. But, like cross-sectional designs, longitudinal studies have limitations. The primary problem is that individual changes are confounded with time of measurement differences. Time passes from one measurement to the next, and events that occur during the interim could have an impact on individuals' performances.

To confront the problems with these two approaches to studying intellectual aging, K. Warner Schaie, at Penn State University, has conducted an ambitious study. His *Seattle Longitudinal Study* has taken place over five decades. He obtains intelligence test scores, using the Primary Mental Abilities Test, on a cross-section of adults in a given year (beginning in 1956), and these persons are retested every 7 years. At each time of testing, a new sample of participants is selected, tested, and followed over time. Thus, Schaie's research combines cross-sectional and longitudinal methods. Schaie has found that most intellectual abilities remain stable or even grow well into the 50s and 60s. Declines in some abilities begin in the 60s, and by the 70s significant losses are evident for most intellectual skills. Even so, there is little impact on everyday cognitive functioning.

Thus, intellectual aging is more complex than originally believed. Some gender differences in intelligence test performance have been observed. Women's test scores decline earlier for biologically determined intellectual domains, while men's scores decline earlier for culturally determined domains. Also, persons with cardiovascular disease and other health problems are most likely to suffer cognitive losses. Studies have shown that older adults can benefit from training designed to improve intellectual functioning. Remaining active and healthy is the key to intellectual vitality in old age, according to many experts.

—M. Cecil Smith

See also Older Adulthood

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INTELLIGENCE

One of Karl Spearman's (an important figure in the early work on intelligence) major works was titled *The Nature of Intelligence and the Principles of Cognition* (1923). Galton, Binet and Henri, Thurstone, and Guilford also published works regarding the concept of intelligence. Nonetheless, cognitive psychology was not identified as a part of psychology until the 1960s according to Kessel and Bevan. The authors of *Plans and the Structure of Behavior* (Miller, Galanter, and Pribram) and *Cognitive Psychology* (Neisser) wrote about mental events such as plans, sets, thoughts, imagery, memory rehearsal, stimulus codings, short- and long-term memory storage, and executive processing. An information processing perspective (Newell and Simon) was later developed in which cognitive problem-solving tasks were described as an integration of programs to process information and the senses. Williams' Aptitude Test Taker program devised its own rules for solving inductive reasoning problems after being given examples. Pellegrino and Glaser stated two approaches of the research: (1) the cognitive correlates approach where relationships between tasks and intelligence test results are investigated, and (2) the cognitive components approach which focuses on revealing parts of cognitive tasks found in cognitive ability tests. The cognitive components approach was described in Sternberg's work in that he analyzed task performances into components. Carroll attempted to link cognitive ability with psychometrics and factor analysis. He performed subjective analyses of 24 factors of cognitive ability, which were described by Hunt in a distributive memory model. Carroll also referred to Newell's statements about mental production systems.

After 1980, groups conducted similar studies. Vernon and Jensen performed studies demonstrating that intelligence tests have significant relationships with performance on reaction-time tasks. Their studies also showed intelligence test correlations with speed of performance on tasks that incorporated retrieving information from long-term memory. After working with Cronbach in studying aptitude-treatment interactions (ATIs), Snow worked on the study of aptitude processes. He worked on developing a theory for how aptitudes may interact with learning processes. Learners with different aptitude profiles may use different learning strategies, or need different

types of instruction for learning success. Snow and Lohman published a summary of this work. Factorial reanalysis in studies of the more important types of abilities demonstrated known cognitive abilities and the kinds of tests and tasks that can be utilized to measure them. Future research should attempt to continue to interpret cognitive ability findings in terms of cognitive psychology concepts.

Gardner, Sternberg, and Das, Naglieri, and Kirby additionally developed cognitively oriented intelligence theories. For example, the triarchic theory of intelligence (Sternberg) and the theory of multiple intelligences (Gardner) described the external worlds of people and the creation of products that are valued by cultures. Both theories could be important to develop assessment more relevant to multicultural populations than traditional assessment. In addition, tasks measuring cognitive processes identified in Das and Naglieri's Planning, Attention, Simultaneous, and Successive (PASS) theory could be important to help people with poor planning skills.

INTELLIGENCE TESTING: A HISTORICAL PERSPECTIVE

Definite trends do exist in test interpretation practice and are outlined by Kamphaus, Petoskey, and Morgan. In the early 1900s, psychologists emphasized assessment of a general intelligence level. After World War II and the development of the first of the Wechsler scales for children, interpretation was based predominantly on profile analysis. Specific profiles and subtest results often were associated with diagnosis. Profile analysis changed in the 1970s because of widespread use of factor analysis. Factor analyses yielded the familiar Wechsler Intelligence Scale for Children—Revised (WISC-R), which was an alternative to interpreting subtest profiles or general intelligence levels. This psychometric approach to intelligence test interpretation included an emphasis on utilizing calculations to reveal significant profiles and factors.

If the purpose of cognitive ability assessment is to sample a behavior that represents a construct in order to make inferences about the construct, recommended by Anastasi, the process of interpretation has been limited by the lack of clarity of the definition of the construct being measured. Kaufman suggested that a problem results from a lack of theory being utilized in the test development process, and developed his Kaufman Assessment Battery for Children (K-ABC) as a solution. In the late 1980s, Woodcock further advanced the effort to increase the meaning of intelligence test results by applying the fluid/crystallized theory in the development of the Woodcock-Johnson Tests of Cognitive Ability—Revised (WJ-R). The K-ABC and the WJ-R used factor-analytic means to form a set of subtests related to their theories, with two or more subtests used to measure a particular trait. Cronbach advocated such a process more than three decades ago, indicating that whether the operations that make up a test relate to a specific universe defines content validity.

Present test interpretation emphasizes theory as central to interpretation. John Horn (Gf-Gc theory) and John Carroll (three-stratum theory) are examples of researchers using theory as approaches to deriving score meaning. These theories will be expanded on in subsequent sections. Kamphaus developed an interpretative approach that utilizes both theory and research findings.

CONTEMPORARY INTELLIGENCE THEORY: CATTELL/HORN GF-GC THEORY

Horn and Noll state that common factors in cognitive ability tests are known as primary mental abilities (PMAs). PMAs include nine broad abilities, several of which appear to represent what has traditionally been called intelligence. This evidence of common factors, in addition to evidence demonstrating different patterns of change for the factors and evidence from neurological functioning and heritability, indicates that a single, unified concept of intelligence does not fully or properly represent human cognitive ability.

Horn and Noll propose that several intelligences, including reasoning intelligence (Gf), the intelligence of knowledge stemming from acculturation (Gc), visual intelligence (Gv), auditory intelligence (Ga), the intelligence of short-term apprehension and retention (SAR), the intelligence of fluency and retrieval from long-term storage (TSR), and quantitative intelligence (Gq) better represent human cognitive ability. In addition, the process of intellectual speed (Gs) and speed of decision making (QDS) may be other forms of intelligence.

Horn and Noll also report evidence from different studies suggesting that the structural organization of

intelligence relates to organization in the central nervous system, genetic and environmental influences, and age differences. No broad intelligence is fully predicted by a combination of the others. They are combinations of different genetic and environmental influences, and are affected by different factors, such as injuries, childrearing, and education. Different patterns of practice in individuals vary in intensity, length, and quality. Broad intelligences increase with learning, practice, and use, and without practice they decrease in strength, as well as with decreasing neurological base. During childhood, all broad intelligences increase. During adulthood, increases in Gc and long-term storage (TSR) are demonstrated, while Gf, short-term apprehension and retention (SAR), and Gs abilities decrease with age.

CONTEMPORARY INTELLIGENCE THEORY: CARROLL'S THREE-STRATUM THEORY OF INTELLIGENCE

In the three-stratum theory of intelligence, abilities are categorized at three different levels or strata, including narrow (stratum I), broad (stratum II), and general (stratum III), which is represented by the psychometric "g" for general intelligence. The three strata that are part of the theory are not strictly defined. Instead, abilities are placed in general categories. The three-stratum theory follows a hierarchical model and should be thought of as an expansion of models developed by researchers such as Spearman, Holzinger, Thurstone, P. E. Vernon, R. B. Cattell, and Horn. Factors, at all strata, appear to relate to individuals' real experiences that make up cognitive performances. Three-stratum theory is a theory of cognitive abilities that attempts to account for total range of cognitive performances. Three-stratum theory also presents an organization in which relationships between different variables can be interpreted.

Carroll reports that genetic influences are present from the research that correspond to a general (stratum III) intellectual factor and to other cognitive factors, such as the stratum II factors proposed in the three-stratum theory. The organization of cognitive abilities does appear to have important relationships with the organization of the brain and the central nervous system according to neuropsychological research.

—Bryan D. Miller

See also Binet, Alfred; Crystallized Intelligence; IQ Tests; Multiple Intelligences; Wechsler Adult Intelligence Scale (WAIS); Wechsler Intelligence Scale for Children (WISC)

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INTERGENERATIONAL RELATIONSHIPS

Intergenerational relationships refer to ties between individuals or groups of different ages. Sweeping changes in American family structure, especially since World War II, have dramatically altered ties between generations for older and younger generations alike. Many intergenerational ties now last longer than at any time in the past. As social networks contract due to loss of spouse through widowhood or, increasingly, divorce, intergenerational relationships are more likely to be the first place that older adults turn for help.

Bengston's theory of intergenerational solidarity points to the multifaceted ways in which generations relate to one another in terms of living arrangements (structural), shared values (normative), norms (consensual), contact (associational) and closeness (affectual), and instrumental support (functional). Older generations are generally perceived to invest in younger generations (generational stake) because resources are often seen to flow down generations. More recent explanations using the contingent exchange perspective have focused on differences in

needs and resources of each generation. In other words, more assistance will be given to the child or the parent with the greatest need. Likewise, available resources may constrain the limits of what is given, and individuals with the greatest resources may be more likely to provide assistance. There is also mounting evidence that patterns of intergenerational exchanges can have important psychological consequences for both parents and children. The circumstances under which this is the case are only beginning to be identified.

Early work on the predictors of intergenerational support have focused on variables such as frequency of contact between parents and offspring, but most current approaches consider the content of, and satisfaction with, exchanges, including instrumental assistance, such as with household tasks or transportation, financial assistance, emotional support and advice, and sharing information. Despite growing consensus on *what* to measure, *how* it is measured often complicates comparisons of findings from studies using different methods for measuring exchange.

Human development scholars have long regarded individuals as being embedded within a latent matrix of support. Unfortunately, most previous research on the characteristics of this matrix has been largely ahistorical and ignored the family as a system of interrelated relationships. We suggest that a shift from considering *families in context* to one of studying *families as contexts* will provide ample theoretical purchase on the antecedents of intergenerational support, and point the way to innovations of measurement, design, and analysis of ties between generations, by considering sources of variability within and between families simultaneously. This can be achieved by capturing the characteristics of multiple relationships at the family, individual (parent and child characteristics), and dyadic level. At the family level, researchers could consider characteristics such as race, ethnicity, and family size. At the individual level, one could measure parent characteristics such as age, gender, marital history, health and functioning, income, education, and labor force participation. Similarly, characteristics of the adult children such as age, gender, marital history, the child's own parental status, biological versus step relationships, and income could be included. While parent characteristics are common among all children, child characteristics may vary across relationships in the same family. A number of indicators of the dyadic relationship between the parent and the adult child could therefore be included. These include residential propinquity and contact, coresidence, relationship quality, and past support between parents and offspring. These variables can be considered as most proximal to exchange and because they are unique to each relationship, they can be expected to account for intrafamilial variability in exchange patterns.

This is an exciting juncture in the study of intergenerational relationships, with plenty of new and emerging family structures, methodological advances, and opportunities for key theoretical advances. It also represents some of the most salient and enduring family relationships individuals will ever experience.

—Adam Davey, Jyoti Savla, and Megan Janke

See also Grandparents

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INTERNET

Internet use is widespread and growing. Current studies indicate that 149 million people are online worldwide, and that the number is increasing at a rate of 12% per month. According to the U.S. Census Bureau, 22.2% of the 76 million American computer users aged 3 and older use the Internet, and one fifth of children with home computers were using them to access the Internet as of 1997. Today, that number is undoubtedly higher. The Internet affects family life, politics, business, education, and social life in a variety of ways, both potentially beneficial and harmful.

EDUCATION

Technology-driven school reform is still relatively new, and yet it is already present in all aspects of education. Supporters claim that the Internet will help propel students into the future and increase their understanding of the world. According to Gillan, the impact of technology is limitless to society, and society now demands that students develop the ability to operate in a technological environment. So much of the planet is becoming connected through the Internet that online protocol has become an important part of technology-based education. Donald J. Leu, Jr., Rachel A. Karchmer, and Deborah Leu of Syracuse University have written that access to the Internet allows all teachers to benefit from learning what occurs in other classrooms around the globe. They point to the example of teachers and children at the Fahan School in Tasmania, who developed online resources that led to connections with schools in Malang, East Java, the International School in the Netherlands, and many others. The Internet offers central sites for Internet project descriptions, central sites for stories of teachers' experiences, and mailing lists or listservs.

Some teachers and researchers, however, question the benefit of Internet use among children and young adults. A national survey conducted by the Annenberg Public Policy Center in Washington found that most parents in computer households fear the Internet's influence on their children, because the Internet exposes them to so much information and so many other Internet users. At a large university in New York, the dropout rate among freshman newcomers rose dramatically as the school's investment in computers and Internet access increased. Administrators learned that 43% of the dropouts were staying up all night on the Internet. No one has proved definitively that the Internet is either "good" or "bad" for children and young people. A recent study conducted at Carnegie Mellon University, called HomeNet, suggests that if parents limit and monitor their children's Internet use, and if educators carefully incorporate Internet technology into their lesson plans, most children will benefit from the technology.

POWER

In all of the spheres mentioned above, the Internet alters the balance of power. The members of society who are traditionally powerful—celebrities, professional criminals, the wealthy, and so on—are given that power through their titles. They are much less powerful on the Internet. Rather, skilled computer users have much more power on the Internet because of their knowledge of its mechanics, not because of a position they have been granted. People whose authority comes from their position do not necessarily lose power, but now, anyone can achieve a powerful position through knowledge of computers. Certain traits that determine social standing in the "real world"—physical appearance, style, confidence and charm in social situations—do not matter on the Internet. The traditional "cool" people may be mocked on the Internet, but they can also be the targets of more serious injury, such as net crime and pranks.

GOVERNMENT AND ECONOMICS

The Internet has affected the business world in many ways. More employees can now avoid the increasingly stressful workplace, the commute to and from work, and the polluted air of big cities by working at home. Some businesses are starting to allow their employees to work at home for 2 to 4 days per week and send their work via e-mail or through direct connection to their company's intranet. Employees can take breaks when they wish, save money on childcare and gas, and set their own hours. This system primarily works for computer-oriented jobs, however, and it can discourage productivity. It may also increase stress for a worker who has many responsibilities at home in addition to his or her job.

The relationship between businesses and consumers is also changing. By selling items over the Internet, companies save money by employing fewer people, eliminating the cost of land and real estate, and reducing administrative costs. Consumers benefit from lower prices and the convenience of shopping at home. Still, because less staff is needed to run Internet sites, the workforce suffers as a result of online shopping. People who shop online do not leave their homes to socialize, get necessary exercise, or help their local economy. The Internet has become a vital tool for businesses like the real estate industry, according to a California Association of Realtors survey. Online information about real estate helps consumers educate themselves better and save money.

Government agencies have also been able to save money by making more information available to citizens online. Developing countries have not been able to take advantage of the Internet as extensively as developed countries, however. In a study published in 2003, the World Library and Information Congress found that in some ways the Internet builds "barriers which seriously widen the gaps among the people in the world and even among people within a country." The WLIC states that developing countries should establish IT plans and policies that help educate people about the Internet. Governments that can take advantage of the Internet have the ability to address issues such as *unemployment*, by creating new jobs in information technology and by keeping better statistics about the unemployment rate; *health*, by setting up health information systems and using telemedicine in remote areas; *commerce*, by accessing information about the import and export of products and by developing and marketing new products; and *tourism*, by strengthening international tourism and reducing the cost of advertising.

SOCIAL AND FAMILY LIFE

A study of Internet users conducted in 2000 by Norman Nie showed that people who spend more than 5 hours a week online are spending less time with family and friends and more time doing work at home. The Center for Internet Studies found that 29% of Internet users report using the Internet to "alter their mood or escape on a regular basis." According to a college listserv survey regarding the effect of technology on personal relationships and communication, the most frequently mentioned potential problem was electronic communication in the forms of e-mail, discussion groups, and chat rooms. Many of the people surveyed described a feeling of isolation related to Internet use. The lack of face-to-face contact was cited as a contributing factor to feelings of alienation and loneliness. Another study suggests that a small but significant number of people blame excessive online use for the breakup of a marriage.

While there is no official psychological or psychiatric illness called Internet addiction, some psychologists believe that compulsive Internet use is a prevalent problem. Online surveys vary, estimating the number of Internet users showing addictive behavior at anywhere from 6% to 80%. Symptoms of an addiction may include: using the computer for pleasure, gratification, or stress relief; feeling irritable or out of control or depressed when not using the computer; spending increasing amounts of time and money on hardware, software, magazines, and computer-related activities; and neglecting work, school, or family obligations.

The Nie study also concluded, however, that the Internet is still used mostly as a helpful information resource. Only 25% of Internet users report actually buying something on the Internet. Only 10% of users report that they trade stocks, participate in auctions, or bank online. Most users see the Internet as a positive addition to their lives as a whole, but it is important to realize that time spent on the Internet is time taken away from family and friends.

SUMMARY

The Internet is a useful tool and a force in society that is not yet fully understood. While it provides indisputable benefits for schools, businesses, and individuals, it causes difficulties for some individuals and populations. Social isolation, Internet addiction, and the vast amount of information available to children are some of the main concerns. Also, developing countries have not yet been able to access all the Internet has to offer, and they suffer a disadvantage compared with the developed world. Most people use the Internet to make their lives easier and to find helpful information. These are the major benefits of the Internet that should be encouraged and distributed throughout the world.

—Tae H. Chang

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INTERRACIAL MARRIAGES

Interracial relationships have existed for years, though society traditionally has had difficulty accepting these unions. Over the years, attitudes toward interracial relationships have changed dramatically and will likely continue to change as our society becomes increasingly diverse.

An interracial marriage is generally defined as the union between two individuals who come from different racial/ethnic backgrounds, such as an African American woman and a European American male. Interracial relationships have been difficult to clearly define, however, due to changing definitions and classifications of race/ethnicity. The social construction of race is an issue at the heart of interracial relationships as well as multiracial children, and affects discussions of these unique experiences.

ATTITUDES AND PRACTICES

Historically U.S. society has had difficulties accepting interracial relationships. From colonial times until the 1960s, antimiscegenation laws declaring race mixing and intermarriage illegal were common in most state laws. These laws were intended to protect "whiteness" and thus were not generally enforced for marriages between racial/ethnic minorities. It was not until the case of *Loving v. Virginia* in 1967 when the U.S. Supreme Court repealed antimiscegenation laws. In this case, a black Native American woman named Mildred Jeter married Perry Loving, a European American. This couple, who was married in Virginia in 1958, was subsequently sentenced to a year in prison for breaking the antimiscegenation laws. With this monumental Supreme Court decision, however, all state laws against interracial marriage were repealed on the grounds that they violated the Fourteenth Amendment, providing the right to pursue happiness.

It appears that society is steadily becoming more accepting of interracial relationships. Surveys from the Gallup Poll of African American and European American adults about their attitudes about interracial marriages demonstrate significant changes. In 1968, for example, 17% of Whites and 48% of African Americans approved of interracial marriage, and by 1997 61% of Whites and 77% of African Americans stated they approved. This shift in attitudes is expected to continue as our society becomes increasingly diverse.

Positive attitudes toward interracial relationships are generally associated with more liberal ideology, higher levels of education, and living in larger cities. Younger generations also appear to be more accepting of interracial relationships. Research with college populations shows that about 50% of students have positive attitudes about interracial dating, though only about 25% report dating someone of a different race. With respect to geographical region, individuals on the West Coast show the greatest approval for interracial marriages, followed by the East Coast and Midwest. Individuals in the South consistently show the lowest approval of interracial marriage, which likely relates to general historical and societal attitudes toward racial/ethnic minorities within this region.

The rate of interracial marriages has also changed significantly over the past years. In 1993 the United States Census reported that almost 5% of all marriages were interracial, which was nearly four times as many as in 1970. Researchers who have studied last names on marriage licenses in Hawaii and California have suggested that the proportion of interracial marriages is higher than 50%. Thus attitudes and practices related to interracial dating and marriage are steadily changing.

SOCIETAL AND FAMILY CHALLENGES

Individuals in interracial relationships report that they get married for the same reasons that other couples do—because they are in love and care about one another. Nevertheless, these couples often face unique issues that distinguish their relationships from those of people who marry within their same race. At the societal level, it is clear that many myths and stereotypes about racial/ethnic minorities, as well as about couples in interracial relationships, exist and can exert a negative influence over interracial couples. Depending on the environment and context of an interracial marriage, individuals may experience discrimination and hostility or, conversely, tolerance and support.

Couples also report that their own family members can sometimes cause conflict if they are biased and discriminatory toward other cultures. In extreme cases, parents may cut ties with children who marry someone from a different race. Often, these parents report that they are particularly concerned about how society will look upon the interracial couple, and how the children of the interracial relationship will be treated. Perceptions that children of mixed race will have substantial identity conflict and problems abound, even while current research suggests that they will be well adjusted.

Because each individual in an interracial marriage represents a different culture, at times there can be conflict over issues such as how to raise children, communication and use of ethnic language, views about caring for the elderly, and religious beliefs. While these issues can clearly affect any couple, regardless of racial/ethnic background, they may be exacerbated in interracial couples because of potentially different values and experiences.

THE RICHNESS OF INTERRACIAL RELATIONSHIPS

Many researchers, as well as society at large, have focused on the challenges faced by couples in interracial relationships without acknowledging the many strengths and benefits associated with such unions. Interracial couples report that their relationships allow them to experience another culture through values, language, shared customs, and traditions. This diversity adds a richness that might not be possible in a union between two people of the same racial/ethnic background. In addition, individuals in interracial marriages who choose to have children have the opportunity to create families with unique, diverse interests and traditions. Some research has even shown that multiracial children raised in these families show more open attitudes toward other individuals from different racial/ethnic groups.

MULTIRACIAL CHILDREN

Rates of interracial marriages have steadily increased in the United States, and as a result there are more children of mixed heritage than ever before. The offspring of interracial relationships are referred to by names such as biracial, multiracial, multiethnic, and mixed race. The existence of multiracial individuals is not a new phenomenon, though. In times of slavery, it was not uncommon for slave owners to have sexual relations with female slaves and then have children who would be considered biracial.

The challenge of classification has become increasingly salient with children of mixed heritage. While society attempts to categorize individuals into rigid racial groups, multiracial individuals challenge this long-held practice because they do not fit neatly into clearly define racial categories. In the 2000 United States Census, respondents were allowed, for the first time, to indicate more than one race as their self-classification. This landmark change allowed multiracial individuals to acknowledge their background, and in the 2000 United States Census, 6.8 million (2.4%) of the U.S. population selected more than one racial box.

Research about multiracial individuals is limited and has generally focused on biracial individuals whose heritage is a mix of a minority group (usually African American) and European American, rather than two minority groups. Nevertheless, with increased attention being paid to this growing population, new insights about the identity formation and functioning in multiracial youth have been proposed. One researcher in particular, Maria Root, has written extensively about multiracial individuals and has integrated findings from sociological and psychological fields to begin to understand this unique population.

Maria Root and other researchers have discussed the psychological impact of being multiracial, as well as how an individual's multiracial identity may develop over the life span. While early models speculated that children of mixed heritage would experience marginalized status and identity conflict, more current research suggests that being multiracial does not necessarily equate with being maladjusted. Indeed, psychologists concerned with societal stereotypes have acknowledged that there is a danger of multiracial individuals internalizing negative stereotypes about themselves. Furthermore, multiracial individuals, because of their unique and ambiguous appearances, may frequently be asked about their background, and may feel conflicted to choose one race (parent) over the other. These legitimate challenges can affect multiracial individuals in different ways based on background, appearance, language, family, and geographical location.

Nevertheless, research suggests that a normal developmental trajectory is expected for multiracial individuals. They will attempt to develop their identities much

as any person would, but these identities will likely be more fluid and flexible because of their unique experiences. Similar to research findings on interracial relationships, studies of multiracial children have suggested that in fact their mixed identity can be a source of richness and strength, instead of conflict.

FUTURE TRENDS AND SUMMARY

Changing views about racial/ethnic diversity within the United States and the ease with which people can cross geographic barriers has led to more interracial relationships, and in turn more multiracial children. Researchers are beginning to understand the positive aspects of such unique experiences, and it is expected that time and effort will continue to be devoted to understanding the challenges and benefits faced by these individuals and couples.

—Lisa M. Edwards

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INTIMACY

According to John Bowlby, the propensity to establish intimate connections to particular individuals is a basic component of human nature; it is present before birth and continues through adult life into old age. The intimate connections that people establish are an important source of meaning in their lives, and the level and quality of intimacy in these connections is directly related to their physical and psychological well-being.

WHAT IS INTIMACY?

Intimacy has been defined in many ways. Yet, there is no single definition on which all agree. There are, however, a number of characteristics on which there is consensus. First, intimacy is interpersonal. It takes place between two or more persons. Second, intimacy is reciprocal—generated not by unilateral desire but by mutual consent. Third, intimacy has cognitive, affective, and behavioral components. Intimates are willing to reveal themselves to one another, care deeply about one another, and are comfortable in close proximity.

Self-disclosure, the sharing of private thoughts, dreams, beliefs, and emotionally meaningful experiences, is often viewed as synonymous with intimacy. Yet, recent formulations emphasize that self-disclosure is only half of the process; the other half is partner responsiveness. According to Harry Reis and his colleagues, for a relationship to be intimate, self-disclosure must occur in a context of appreciation, affection, understanding, and acceptance. Indeed, an intimate experience has not taken place until there is empathic feedback—until acceptance and acknowledgment are communicated verbally or nonverbally as an indication that trust is justified. Fourth, then, intimacy is validating.

In the absence of empathy, attempts at intimate support can miss the mark. Those making emotional disclosures usually want an emotional response. Those making pragmatic or factual disclosures often want a factual response. In the absence of empathy, emotional concerns may be met with a pragmatic or problem-solving response, or, conversely, pragmatism may be met with emotion. Studies suggest that emotional disclosures lead to greater intimacy than do factual disclosures. But regardless of kind, mismatched responses leave the discloser feeling misunderstood and devalued rather than affirmed and validated. Under these conditions, intimacy will suffer.

HOW ARE PATTERNS OF INTIMATE RELATING ESTABLISHED?

Considerable research suggests that the capacity to establish affectional bonds begins in infancy and is rooted in the kinds of attachment styles that infants develop with their early caretakers. When parents or caretakers are consistently responsive and warm, infants develop a secure attachment style characterized in adulthood by ease in trusting and getting close to others and a comfort with both intimacy and autonomy. When parents are inconsistent and insensitive, children develop attachments described as anxious-ambivalent or preoccupied. An anxious-ambivalent style of relating

is characterized by overdependency in adulthood. Such relationships are marked by a desperate desire to merge with a partner alternating with a fear of not being loved sufficiently. When parents are cold and rejecting, children develop an avoidant style. According to Kim Bartholomew, there are two types of avoidance—fearful and dismissive. Those who are fearfully avoidant desire intimacy but experience pervasive interpersonal distrust and fear of rejection. Those who are dimissively avoidant place much value on independence. They focus on work or hobbies and defensively assert that relationships are relatively unimportant.

WHAT ARE THE BENEFITS OF INTIMACY?

Availability and quality of intimacy are associated with well-being for men and women alike. Studies showed that men who reported they felt a lack of emotional support from their wives were far more likely to experience heart attacks. Several other studies showed that both men and women in relationships rated as high in intimacy were less likely to report symptoms of depression and anxiety than those in relationships rated as low in intimacy.

SUMMARY

In sum, intimacy is interpersonal, reciprocal, and validating. Intimacy is a process that develops, fluctuates and changes over time and is never completed or fully accomplished. Yet intimacy is an important component of human existence that gives meaning to people's lives and is directly related to their physical and psychological well-being.

—Janice M. Steil

See also Emotional Development

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IONIZING RADIATION

Ionizing radiation in sufficient dosage has been known to disrupt prenatal development almost since the discovery of X-rays. Case reports of birth defects in children prenatally irradiated appeared in medical journals as early as 1929. The effects of high dose prenatal ionizing radiation are smaller stature, microcephaly, eye malformations, mental retardation, and lowered IQ test scores. After the atomic bombs were dropped on Hiroshima and Nagasaki in 1945, the United States and Japanese governments began cooperative research on the survivors, children who were in utero at the time of the bombings, and later-born children of survivors. Dosages of in utero ionizing radiation were reconstructed using data from atom bomb tests in Nevada in the 1950s, research with animals, and the self-reported locations of the pregnant women at the times of the bombings. Probability of severe mental retardation, IQ test scores, and teacher ratings of school performance showed dose–response relations to exposure such that higher doses yielded a higher chance of severe mental retardation, lower IQ test scores, and worse school performance. The dose–response relation for severe mental retardation was steepest for exposure at 8 to 15 weeks postconception, a 43% increased risk, per gray, of exposure. At 16 to 25 weeks the relation was weaker, and was not detectable at less than 8 weeks or greater than 26 weeks age postconception. Small head circumference was associated with radiation exposure 0 to 7 weeks postconception. Seizures of unknown origin were also associated with exposure 8 weeks or more after conception. Likely mechanisms for the effects of prenatal ionizing radiation on brain development include alterations of neuronal proliferation, neuronal migration, programmed cell death (apoptosis), and synaptogenesis. Laboratory experiments show that ionizing radiation alters molecules on the surfaces of neuronal cells that contribute to cell adhesion and migration.

The effects of ionizing radiation on human health are highly controversial. Research controversies about

risk estimates based on the Japanese atom bomb survivors concern whether there is a threshold below which no developmental effects of ionizing radiation occur, whether the "nonexposed" survivors in Hiroshima and Nagasaki are an appropriate comparison group to those who were highly exposed, whether the increase in voluntary abortions following the bombings may have affected the results, the possibility that fetuses and embryos that were miscarried as a result of the bombings could yield a biased sample of survivors, the appropriateness of extrapolating from acute exposure in a single event to low level intermittent or chronic exposure, and the potential effects of other variables in wartime Japan, such as stress and malnutrition.

Other developmental effects of pre- and postnatal ionizing radiation include an increase in childhood leukemia, thyroid cancer, other cancers, and possibly arteriosclerosis. Prior to a landmark study in England by Alice Stewart in the 1950s, diagnostic X-rays of the abdominal area during pregnancy were considered to be safe.

Experts advise that a qualified medical physicist or radiologist be consulted if a pregnant woman has received diagnostic or therapeutic ionizing radiation. It is important that the dosage be calculated accurately in order to estimate risks. Most diagnostic X-rays are estimated to have an extremely low risk to the fetus or embryo. Avoiding unnecessary diagnostic irradiation during pregnancy because of risk is advised, but is separate from the issue of choosing to terminate a pregnancy because of the very small chance of disease or malformation. For example, even if the risk of leukemia is elevated by approximately 50% over a 10-year period due to 2 rads of prenatal diagnostic ionizing radiation, elective abortions would sacrifice approximately 1,999 unaffected children in order to avoid the birth of one child who would be subject to leukemia.

—Colleen F. Moore

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IQ TESTS

IQ tests provide us with a quantitative measure of intelligence, known as the Intelligence Quotient (IQ for short). This type of testing has a long and rich history, beginning in Europe over a century ago. Though we still use variations of many of these early tests today, there is much controversy over measuring intelligence in this way. The current pressing question is: How useful are IQ tests to us today?

THE HISTORY OF IQ

As a society we have long had an interest in quantifying the concept of intelligence. From measuring head size, to judging intelligence by facial features, many individuals have made efforts to develop ways to measure intelligence. When the above measures were proven invalid, researchers began to explore the idea of measuring intelligence with a series of performance tests. Alfred Binet and Theodore Simon developed the first intelligence test considered to be valid in 1905. This test, the Binet-Simon scale, was designed to identify children, then termed the "mentally handicapped," who were struggling in school. Soon after this test was introduced, Lewis Terman of Stanford University translated this test from French into English and brought it to the United States.

It was in the scoring of this revised test, the Stanford-Binet, that the term "IQ" was first coined. Terman used a formula dividing a child's *mental age* by his or her *chronological age* (actual age). This result was then multiplied by 100, yielding the Intelligence Quotient (IQ). Terman, however, did not use the test for the purpose it was intended; he decided instead to use the Stanford-Binet to compare children of varying ages with regard to intelligence. Though this type of quotient system worked well with children and teens, there were problems with this formula when testing adults; how could one fairly distinguish between the developmentally appropriate capabilities

of a 40-year-old in comparison with a 45-year-old? David Weschler led the charge to find an accurate measure of intelligence, and devised new strategies to obtain a number that used norms to compare adults to an "average" score. The Weschler intelligence tests are some of the most commonly used tests in the field today. These tests include the Weschler Adult Intelligence Scale, third edition (WAIS-III), the Weschler Intelligence Scale for Children, third edition (WISC-III), and the Weschler Preschool and Primary Scale of Intelligence, revised (WPPSI-R). The Stanford-Binet, fifth edition (SB5), is also used frequently to measure ability today.

POPULAR IQ TESTS OF TODAY

The Stanford-Binet remains a popular test for assessing the intelligence of children and adults today. Now in its fifth revision, the SB5 measures intelligence in individuals aged 2 to 85, using five main factors—fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, and working memory—and the ability to compare verbal and nonverbal performance.

The Weschler tests also remain a common choice for today's psychometricians. These tests measure along two subscales: verbal ability (including, but not limited to, such tasks as defining words, finding similarities between objects, and comprehension of certain situations) and performance ability (e.g., tasks such as finding missing details from pictures, completing patterns, and manipulating blocks into particular designs), leading to three scores: verbal intelligence quotient (VIQ), performance intelligence quotient (PIQ), and the full-scale intelligence quotient (FIQ). The average score is 100, with a standard deviation of 25 points. This means that a FIQ score of 100 conveys an "average" level of intelligence. Above this distinction, classifications exist such as "above average," "superior," and "very superior." Below this 100 point mark, classifications such as "borderline," "low average," and "very low average" exist.

CURRENT ISSUES IN IQ TESTING

Appropriate Interpretation

In past decades, IQ testing was conducted in a more indiscriminant way. For example, tests were given to all children for the purpose of labeling and ordering them along tracts "appropriate" for their level of intelligence. Today, educators and mental health professionals understand the importance of interpreting these test scores as only part of the child's true potential and ability. Though it is commonly believed that IQ tests measure a child's potential, this is not the case; IQ tests are only able to assess current cognitive ability. Without accurate interpretation of these scores, children can be labeled in ways that could be detrimental to their psychological adjustment.

Multifaceted Nature of Intelligence

A second issue that is currently being debated with regard to IQ testing surrounds the actual definition of intelligence. While tests such as the Stanford-Binet and the Weschler tests measure verbal and performance-based qualities of intelligence, there are many researchers who say that these types of tests do not capture the true nature of intelligence.

Robert J. Sternberg has defined intelligence in three parts. This "triarchic theory of intelligence" includes a facet termed componential intelligence (the types of abilities measured by common intelligence tests), but adds two more components. Sternberg's contextual intelligence encompasses an individual's ability to adapt to the environment. This facet is the "common sense" part of intelligence. Finally, Sternberg includes experiential intelligence, which is defined by an individual's ability to deal effectively with both new and old tasks and situations placed before him or her.

A second theorist, Howard Gardner, has defined intelligence as having even more facets. In his Multiple Intelligences theory, Gardner states that intelligence cannot be determined by measuring abilities in just one area. Instead he advocates that individuals may be intelligent in areas outside of the traditional view of intelligence. Gardner's intelligences include areas of linguistic, bodily-kinesthetic, logical-mathematical, spatial, musical, interpersonal, intrapersonal, and naturalistic intelligence. He, too, sees a need for a wider definition, and therefore testing process, to accurately measure intelligence.

Cultural Bias

Finally, the issue of cultural bias has been an important part of the IQ controversy for many years. It has been found that individuals from racial and

ethnic minority groups in the United States often score much lower on IQ tests when compared with individuals from the majority culture. Many scholars and practitioners feel that some of the types of questions asked on common intelligence tests are biased in the direction of the majority, middle-class culture in the United States. Questions that assume a broad exposure to the majority culture pose a problem for members of the many subcultures that exist in the United States.

To demonstrate some of the links between items on IQ tests and cultural knowledge, Stephen Jay Gould asked Harvard students to point out the missing features of pictures of objects that are not a part of popular culture today, but have been in the past. One such item depicted a Victrola record player that was missing its horn. Almost none of the students in the sample were able to identify this object as it is no longer a part of popular culture. Because many items on IQ tests involve tasks such as these, tests may be unfair to individuals of certain racial and ethnic cultural groups as well as to individuals from certain socioeconomic classes who may not have been exposed to some of the items.

In addition, individuals from racial and ethnic minority groups may score lower on tests because of a concept called *stereotype threat*. Claude Steele, a researcher at Stanford University, posits that there are many negative stereotypes that exist toward certain groups in our society. He states that there are stereotypes that women do not do as well in math as men, and that African American students are not as academically proficient as Caucasian students. While these stereotypes are groundless on an individual level, they are common myths and as such may exert extra pressure on members from these groups when taking tests. Indeed, individuals in Steele's experiments of this phenomenon report that they often feel pressure not to confirm these negative stereotypes. This "pressure" may manifest itself in the form of "testing anxiety" and may lead to lower scores for these individuals.

CONCLUSIONS

It is important to note the aforementioned limitations when considering the use of IQ tests in today's culture. However, if used correctly and interpreted with caution and consideration of the limitations, IQ tests can be useful in determining areas of cognitive strengths and weaknesses. Professionals in this area of the field, including educators, school psychologists, and counselors, have a responsibility to uphold the true nature of the scores obtained through the use of IQ testing. In addition, it is important that scores on tests such as these not be used to label or stunt the development of children's cognitive abilities. Having more knowledge about the benefits and limitations of these tests can improve our appropriate use of them.

—Jennifer Teramoto Pedrotti

See also Intelligence, Multiple Intelligences

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ISLAM

In the name of Allah, most benevolent, ever-merciful.
ALL PRAISE BE to Allah,
Lord of all the worlds,
Most beneficent, ever-merciful,
King of the Day of Judgment.
You alone we worship, and to You
Alone turn for help.
Guide us to the path that is straight,
The path of those You have blessed,
Not of those who have earned Your anger,
Nor those who have gone astray.

So begins the Qur'an, the holy book of Islam. Islam is one of the three great monotheistic religions in the world, Judaism and Christianity being the other two, all of which, ironically, focus on the same deity, the God of the prophet Abraham. Indeed, for Islam's prophet Muhammad there is but one true faith, and his teachings and transmission of the word of Allah (one of the ninety and nine names for God) are the latest

and definitive message. For its followers, *Muslims*, Islam is the true religion of the prophet Abraham. The word refers to a peaceful submission to God's will. Islam takes for granted that one day all of the peoples of the world will see the wisdom of God's message and will embrace Islam in peace, creating a single *community of the faithful*, an *ummah*. Today, Islam is the second largest religion in the world, second only to Christianity by numbers, and comprises about one fifth of the world's population. Islam stresses that there are only two realms on earth, the *dar al-salam* and the *dar al-harb*. The former, the *abode* or *house of peace*, and the latter, the *house of war*, refer to the Islamic world, that part of humanity that has embraced Islam, and the rest of the world, which has not and is therefore in constant turmoil or conflict with the forces of disbelief.

The beginning of Islam is popularly associated with the prophet Muhammad. However, Muhammad stressed that his message simply completed the true religion of the God of Abraham. Still, the importance of Muhammad is such that some came to refer to the followers of Islam erroneously as *Mohammedans*, a phrase that is unacceptable to Muslims because it unduly focuses on the prophet rather than God.

THE SIRAH: THE COMING OF MUHAMMAD

Muhammad was born into the banu Hashim, or Hashimite, clan of the Quaraysh tribe in the city of Mecca in 570. The Quaraysh were the dominate economic and political power along the Red Sea coast, the Hijaz, an area that had become important because of its central location along a number of vital trade routes. In general, the peoples of the Arabian peninsula were all organized by hereditary tribes. The tribes of the interior and the Hijaz were nomadic, *bedouin* (*bedou* in the singular); they made their living by raising animals (goats, sheep, horses, and camels), trade, and by raiding each other. It was a society that was proud of a warrior tradition. The tribes in the south, the Yemen, were largely sedentary and agriculturally based. Blood relationship was the basis of this society. Religiously, each tribe varied according to its particular history. Some were Christian, some Jewish (by faith), but most recognized tribal religions that often made reference to a common ancestor. Most of the tribes recognized the importance of a structure in Mecca that housed a black stone (possibly a meteorite) constructed by the prophet Abraham and known as the *Ka'ba*. The *Ka'ba* also formed the center of an annual festival, or fair, in Mecca, the *Ukaz*. The *Ukaz* provided the opportunity for trade, worship, and peaceful tribal competitions and proved very lucrative to the Quaraysh. This was the time and culture that Islam describes as the Period of Ignorance, or *jahhiliya*. Ignorant because Muhammad had yet to bring the word of God, and also because of numerous practices that he would condemn including blood feuds, tribal raiding, the poor status of women, and on occasion the infanticide of female children.

Orphaned at an early age, Muhammad was raised by paternal relatives, his grandfather Abdul Muttalib and later his uncle Abu Talib. With the exception of one story, there is little about the youth of Muhammad that yielded great religious significance. But while on a trading expedition with Abu Talib, Muhammad encountered a Christian monk by the name of Bahira who noticed what he claimed to be the seal of the prophets between Muhammad's shoulder blades and proclaimed him as a promised apostle. Muhammad's marriage to the wealthy widow Khadija in 595 proved to be more important. Khadija was something of an exception in early Arabian society. She had inherited her husband's commercial business and was considered a woman of substance and status. Islam allows up to four wives but Khadija was Muhammad's only wife until her death. The marriage allowed Muhammad free time to meditate, usually in a cave in Mount Hira outside Mecca. It is related that while in that cave in 610, Muhammad was confronted by the angel Gabriel who commanded him to *read*. Muhammad replied that he was no reader; he could do the simple arithmetic required as a merchant but was otherwise illiterate. Gabriel again commanded him to read. Muhammad realized at that point that indeed he could read and write. This began the process by which Muhammad became the messenger, *rasul*, of God through Gabriel. Following his experiences with Gabriel, which were the only miracles claimed in his life, Muhammad began preaching God's message in Mecca,

SAY: "HE IS God
the one the most unique,
God the immanently indispensable.
He has begotten no one,
And is begotten of none.
There is no one comparable to Him."

The first to embrace his message were his wife, Khadija, his father-in-law, Abu Bakr, and his cousin, Ali. His preaching was viewed as threatening to the leaders of the Quaraysh, who did not object overtly to his religious message, but feared that Muhammad might disrupt the importance of the *Ukaz*, the *Ka'ba*, and accordingly the position of the Quaraysh. The anxieties of Muhammad's own tribe soon deepened. He was nearly stoned to death and finally confined to the city of Mecca.

In 620, the inhabitants of the city of Yathrib invited Muhammad to mediate problems in that community. The reputation of Muhammad as honest and wise served him well in this instance, but the Quaraysh determined that he might be an even greater problem in a new setting and refused him permission to leave Mecca. In 622 Muhammad sent many of his followers ahead to Yathrib while he planned his own escape. On September 24, 622, Muhammad arrived in Yathrib. The flight of Muhammad from Mecca to Yathrib is known as the *hijra*, an event so important that it marks the beginning of the Islamic calendar. Muhammad mediated the problems of Yathrib and was soon accepted as the city's leader. In his new role, Muhammad changed the name of the city to Medina and began to form a new community according to a series of edicts later known as the *Constitution of Medina*. The essence of this community was common faith in God, not blood relationship or tribal lineage, or established territory, thus the reference to the *ummah*, the *community of the faithful*. Possibly as a matter of political practicality, Muhammad announced that Jews (a significant part of the population of Medina) were to be considered part of the *ummah*, and Christians, as *people of the book*, were to be under its protection.

Conflict with the Quaraysh ensued. Following a peace treaty, the Treaty of Hudaibiya, Muhammad arranged for a peaceful return to Mecca in January of 630. The Quaraysh accepted Muhammad and the *umma* expanded to include first this tribe and then most of the other tribes of the Arabian peninsula, according to personal treaties or conversion to Islam. In this context alone, Muhammad secured a place in history as the only man to unify the tribes of Arabia. Muhammad was a prophet, hero, statesman, author, conqueror, and a social reformer. He created the Arab nation, and dramatically reformed an ancient tribal system. He replaced blood relationship with common faith, and tribal custom with a singular law, God's law, the *shari'a.*

ISLAMIC BELIEF (IMAN) AND PRACTICE (IBADAT)

The body of Islamic belief and practice can be summarized in Islam's *Articles of Belief* and *Articles of Practice*. Adherence to these articles, along with acceptance of God, is generally considered a personal obligation based on a personal relationship with God. There is no church, no church hierarchy or administration, no formal clergy. There are, however, clerics that gained recognition based on the respect of their local communities and their knowledge of the Qur'an and the *shari'a*. The terms *mullah* and *ulem* (*ulema* pl.) apply in this instance. A more honored title is applied among *Shia* Muslims, *ayat Allah* (reflection of God), or *ayatollah* in the Western translations.

The particular tenets of Islamic belief are found in the *Iman* or *Articles of Belief*, also known as the *Doctrines of Belief*. The first article is *The Doctrine of the Unity of God*. The fundamental element of Islam is that there is no God but God. Islam recognizes no deity save the God of Abraham, *Allah*. Islam describes God as a purely spiritual and universal being. References to God the father are rejected in that they suggest an anthropomorphic figure. The second article is *The Doctrine of Prophethood*. Muhammad related that, in his wisdom, God has provided mankind with a prophet for each era in history. The first prophet was Adam, but the final prophet, the *Seal of the Prophets*, was Muhammad, thus denoting the final era and the pending final judgment. Islam accepts all of the prophets of the Old Testament including Abraham and Moses. Jesus of Nazareth is also recognized, but as a prophet, not the Son of God. Often a distinction is made between the reference to *prophet* and *messenger*. The latter designation is sometimes used to refer to Moses, Jesus, and Muhammad because their messages were recorded in writing. Thus they are both prophet and messenger. The third article is *The Doctrine of the Book*. The reference here is literally to the word of God as recorded in the Old and New Testaments, but of course also the Qur'an (the *reading* or *recitation*). The earlier testaments are not rejected out of hand, but it is believed that through mistranslation and corruption much of the true meaning of each work has been lost. Only the Qur'an has remained as the definitive word of God. The Qur'an is divided into 114 chapters, known as *surahs,* organized according to length from longest to shortest with the exception of the very brief prologue. The Qur'an also provides the essence of

traditional Muslim education, learning reading and writing from the Qur'an, in the *madrasa.* Purists still hold that the only way to truly understand the Qur'an is in the original Arabic because that is Allah's favored language. It was also generally believed that the only acceptable means of copying the Qur'an was by hand. The fourth article is *The Doctrine of the Final Judgment*. As the Seal of the Prophets, Muhammad was the last of God's agents before the final judgment of mankind, which is at hand. All people will be judged personally by Allah. Those who led good lives will go to paradise, a resplendent and well-watered garden. Those who did not are doomed to the fires of hell. The judgment will be preceded by a physical resurrection, but not by the arrival of a *messiah* or even the *second coming* of Muhammad. It is emphasized that those who die in the service of God are *martyrs* who go straight to paradise. *Martyrdom* is not generally encouraged, however. Suicide is a sin without exception. *Sunni* Islam focuses much less on martyrdom than *Shi'i* Islam which is due to the vital significance of the death of Muhammad's grandson, Husayn, at Kerbala. The suffering and final death of Husayn have become part of the fundamental body of belief among the *Shia* Muslims often portrayed in *Shia* versions of *passion plays*. The final article is *The Doctrine of Angels and Jinns*. Angels are those creatures created by God from fire to serve both God and man. *Jinns* are creatures that are generally associated with the fallen angel *Iblis* or *Shaytan*.

Islam also incorporates a set of good acts to be practiced by Muslims. The *Ibadat* or *Articles of Practice* are also known as *The Pillars of Islam*. First and foremost among these pillars is the *shadada*, the witness or profession of faith. To become a Muslim, there is no formal ceremony, no baptism, but one must accept in one's heart and mind the basic notion that there is no God but God, and that Muhammad is His messenger. The second pillar is *salah*, prayer. Muslims are to pray five times a day, before dawn, at dawn, noon, afternoon, and evening. If one prayer is missed it should be made up later in the day. Islamic prayer involves a certain amount of ritual. One must wash their hands and feet before prayer to symbolize the cleansing of the mind of worldly thoughts. Ritual bowing, standing, and sitting all demonstrate respect for God, as does covering one's head (generally at all times, but especially during prayer). One should pray in a *mosque* (a house of prayer and study) though this is not always possible. Both men and women can pray in a mosque but, as with other activities, women must be separate from men. One should also face toward Mecca during prayer. The hour of prayer is announced by the song of the *muezzin,* usually from the towering minaret of a mosque. The third pillar is *zakah,* or *alms-giving*. Muslims should attempt to care for the unfortunate. But if the act does not come from the heart it should be avoided. The fourth pillar is *sawm,* or *ritual fasting* during the holy month of *Ramadan*, the ninth month of the Muslim calendar that marks the celebration of Muhammad's revelations through Gabriel celebrated on the 27th as the *Night of Power*. During *Ramadan,* eating, drinking, and other activities (sexual conduct) are forbidden during daylight hours but allowed after sundown. In practical application, most Muslim communities close down during the day and most people sleep during that time, while at night the holy month is celebrated. The end of the fast of *Ramadan* is celebrated on the first day of Shawwal with the *eid al-fitr*. The fifth pillar is *hajj,* or *pilgrimage*. Muslims should make pilgrimage to Mecca and pray at the *Ka'ba*. Muhammad emphasized that the importance of the *Ka'ba* was in the simple fact that the inner structure had been built by the prophet Abraham, thus retaining the significance of both the *Ka'ba* and Mecca in Islamic tradition. Originally, Muslims were urged to make pilgrimage once a year, but when this became difficult, if not impossible, the obligation changed to as often as possible but at least once in a lifetime. *Dhul Hijjah*, the 12th month of the Muslim calendar, is the month of *hajj*. Those who make *hajj* are referred to as *hajji* and sometimes add this as a title to a name. Often a sixth pillar is included, *jihad* or *holy war*. The literal translation of *jihad* as a struggle or as striving comes from the Arabic phrase *jihad fi sabil Allah*, or *striving in the path of God*. There are two definitions of *jihad* and both can be traced to Muhammad. One, *greater jihad*, refers to the constant threat of disbelief in every individual, which requires spiritual battle and vigilance for the believer to remain faithful. The other, *lesser jihad*, involves the possible necessity of defense of the *umma* or its people from outside attacks, invasion, or threat. As a form of defensive war, *jihad* is comparable to the concept of *jus bellum* or *just war* in the West. It was limited exclusively to self-defense and was required to adhere to the strict limitations of part of the *shari'a*, Islamic law, known as *siyar*. *Jihad* also became somewhat problematical because only the legitimate leader of the Islamic community could declare

it. But once declared it became the religious obligation of all Muslims to defend the community. *Shia* Islam does include *jihad* as a sixth pillar along with a seventh pillar, the invocation to do good acts and avoid evil thoughts. Islam considers a number of things as *haram*, or strictly forbidden. The eating of pork and the consumption of wine or any alcoholic beverage are forbidden.

Lacking a church, formal clergy, and many of the formal rituals found in Christianity such as baptism, Islam is a very simple religion. This simplicity is accentuated in the fact that all men, regardless, of nation, class, or economic status are equal before God. Generally, this is true of women, as well, although the particular roles of women are prescribed by the Qur'an. The extreme subservience of women in some modern Muslim countries is not based on the *shari'a*. Indeed, in cases of marriage, inheritance, and a host of other instances, the rights of women are clearly established by the *shari'a*, but they are not always recognized by society.

Islam permeates the daily lives and activities of all Muslims. This is symbolized by the inclusion of a variety of phrases that are integrated into common conversation. *Allah hu Akbar*, *God is most great*. *Bismillah*, *in the name of God*. *Inshah Allah*, *if God wills*. *Al-hamdulillah*, *praise be to God*. The standard Muslim greeting is simply *salam,* the Arabic word for *peace*, which, in this case, is an invocation of *God's peace*. Some rare individuals are believed to have God's special blessing, the *baraka*.

There are numerous holy sites in Islam. The most important of these are the city of Mecca and the *Ka'ba*, and Medina, the first place of worship in Islam. Second to these places are Jerusalem, in general because of Islam's inclusion of Old Testament and New Testament prophets and figures, but also because of two great mosques, the al-Aqsa Mosque and the Dome of the Rock. The Dome of the Rock holds dual significance in that it is believed to be the place where Abraham offered sacrifice, and the place where Muhammad ascended to paradise, which is celebrated as the *Night of miraj*, *lalat-ul miraj*, on the 27th of *Rajab*. *Shia* Islam adds two cities to this list—Najaf, where Ali was buried, and Kerbala, the city where Husayn, Muhammad's grandson and Ali's son, was *martyred* according to *Shia* interpretation.

Questions usually arise involving comparisons of Islam with Christianity. As noted earlier, in Islam references to God, or Allah, as the father are considered abhorrent because it suggests a sense of physical generation. Accordingly, Jesus is described as being conceived of the breath of God as was Adam. He was one of a series of prophets with perhaps an additional sense of importance as a *messenger of God*. Islam rejects the death of Jesus by crucifixion suggesting that it was one who was made to resemble him. Ironically, beyond this point, Islam accepts a good deal of the Christian interpretation of Jesus. Miracles occurred, but were the work of Allah. Mary, the mother of Jesus, was a virgin. And Islam has no problem with the resurrection, which is, of course, fundamental to Islam's fourth article of belief.

ISLAMIC LAW: THE SHARI'A

The cornerstone of Islam is the *shari'a*, the body of Islamic law, which is characterized as the *straight path*. The *shari'a* is *God's law*. The three sources of Islamic law are the Qur'an, the *hadith*, and *sunna*. The *hadith* are traditions, sayings, and actions attributed to Muhammad through a variety of individuals that are not all accorded the same level of authenticity. Therefore, some hadith have a greater weight than others. The *sunna* includes more general traditions related to the prophet, but also may include certain pre-Islamic traditions or elements of customary law not in violation of the Qur'an. Legal questions are generally considered through a process of analogical deduction known as *qiyas*. The Qur'an is the first source considered. If it does not produce a specific answer, the *hadith* are examined. *Sunna* comes into play if the previous sources fail to produce an answer. *Consensus* or *ijma* is sought in all legal questions rather than a personal interpretation. Indeed, the personal interpretation of the law, *ijtihad*, became severely restricted in *Sunni* society after the 9th century. *Shia* Islam, with a much greater recognition of religious clerics, has traditionally made much greater use of *ijtihad*. One who is deemed capable of *ijtihad* based on knowledge of the *shari'a* is a *mujtihad*. There are no traditional judges in Islam, but the title of *qadi* is a rough equivalent. Again, all clerical titles are expressions of local recognition of an individual's knowledge about the law and the Qur'an.

Local approaches to the *shari'a* are based on the views of four traditional legal schools of thought, which can be distinguished according to their particular stance on interpretation. The *Hanafite* school began with Abu Hanifa (d. 766) and can be considered

liberal. The *Malakite* school started by Malik ibn al-As (d. 795) is essentially conservative. The *Shafi'ite* school of Imam al-Shafi (d. 820) considered both of the previous schools as overly extreme and suggested a more methodological approach emphasizing *qiyas* known as *fiqh*, often referred to as Islam's science of jurisprudence. The fourth school, the *Hanbalite*, began with Ahmad ibn Hanbal (d. 855), a reactionary who equated *innovation* or *bida* with sin. The impact of ibn Hanbal effectively stifled the general use of *ijtihad* in *Sunni* Islam and replaced it with the concept of *taqlid*, literally a legal decision based on the authority of an established predecessor, but in practical use came to be simply blind imitation. Islamic law was, for a long time, remarkably flexible, but in *Sunni* society it became more and more stultified.

ORTHODOXY AND HETERODOXY IN ISLAM: SUNNI AND SHI'I ISLAM

The vast majority of Muslims in the world today are *Sunni* or, according to Western terminology, *orthodox*. The largest Muslim populations are found in Indonesia, Pakistan, India, and Egypt, and the predominant sect in every one of these countries is *Sunni*. The largest minority sect is *Shia* Islam, which accounts for some 90% of the population of Iran and about 60% of the population of Iraq. While *Sunni* and *Shi'i* Islam represent the majority and the most significant minority, it is important to note that historically there have been at least 72 sectarian offshoots of Islam. Most of these heterodox interpretations have themselves been variations of *Shia* Islam.

Curiously, most of the early divisions in Islam had little to do with religion and much to do with politics. *Shia* Islam began as a dispute over which of the Prophet's companions should succeed Muhammad as the first *caliph*, *commander of the faithful* or *lieutenant of the prophet*. A very demonstrative group supported the claim of the Prophet's son-in-law and cousin, Ali, though it seems that Ali himself was never as committed to this issue. Known as the *shia tu Ali*, quite literally the *party of Ali*, these followers demanded that the successor be a male, blood descendant of Muhammad. The *shia tu Ali* only grudgingly accepted the first three *caliphs* (Abu Bakr, Umar, and Uthman) and upon the murder of the third proclaimed Ali to be the rightful caliph. Ali seemed to be happy with his predecessors as caliph and with his followers' support of himself as the fourth commander of the faithful. Other factions in the community, relatives of the third caliph, Uthman, were not, however. The Umayya clan of the Quaraysh tribe challenged Ali's claim based on the accusation that Ali had been part of a conspiracy to murder Uthman, the scion of the Umayya. The Umayya claimant was the governor of Syria, Muawiya. In 660, Muawiya declared himself to be the rightful heir and Islam appeared to be on the road to sectarian disaster. The conflict came to an effective end the next year when Ali was murdered by a former supporter who, along with a group known as the *Kharijites*, had broken with Ali over a dispute involving Ali's prerogative to negotiate with Muawiya during the Battle of Siffin in 657. The *shia tu Ali* led by Ali's son Husayn attempted to renew the conflict, which was put to a final end near the city of Kerbala where Husayn and many of his *Shia* followers were killed. The *Shia* interpretation of the *martyrdom* of Husayn became one of the defining events of that sect. Accordingly, he and his followers were betrayed, tortured horribly, and then put to death. The event is still commemorated by the *Shia* as *ashura* on the tenth day of the month *Muharram*. It is at this point that religious elements began to form. Following Husayn's death, the *Shia* proclaimed that he, his father, and his brother, Hasan, were all martyrs and were also acclaimed as *Imams*. The word *imam* had been in common usage before this but as something of a generic term for a leader in prayer.

The foundation of the religious separation between *Sunni* and *Shi'i* evolved from the nature of the *Shia Imam* and the attributes attached to the individuals who were given this title. Eventually, it would be believed that *Imams* were infallible, could communicate with God, were impervious to harm, and cast no shadow. This was totally unacceptable to the *Sunni* for whom only the Qur'an and God were infallible, and who perceived the whole notion of the *Shia Imam* as a clear violation of the *Doctrine of Prophethood*. The religious separation has been deep and at times quite violent.

Most of the variations within *Shia Islam* follow from which or how many of the *Imams* are venerated. The majority of *Shi'i* are *Twelvers*, that is, they accept a line of twelve *Imams* beginning with Ali as the first *Imam*, Hasan as the second, Husayn as the third, and Muhammad al-Muntazar as the twelfth. The Twelvers believe that al-Muntazar, also referred to as the *mahdi*

or *expected one*, went into occultation in 878, that is, he went into hiding, but will reveal himself at the moment of the final judgment. The *Doctrine of the Return* thus became a central element of belief for most *Shi'i*. Other *Shia* offshoots include the *Zaydis* who accepted only the first five *Imams*, a line that ended with the fifth *Imam*, Zayd; the *Ismailis* who embraced seven *Imams* and focused on a disputed member of the line, Ismail; an *Ismaili* offshoot, and the infamous *Assassins,* a sect that practiced ritual, political, and religious murder, often under the influence of certain drugs (hemp or hashish). Relatively few of the minor *Shia* sects have survived. Islam did, however, produce a mystic variation often in a monastic fashion, *Sufi* Islam, the *darwish*.

—G. Michael Stathis

See also Religion

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J

Juvenile Delinquency

Juvenile delinquency is a modern term for what we did when we were kids.

—Anonymous

JOINT CUSTODY

Child custody issues can arise for a number of reasons, including parental death, unmarried motherhood, and the severance of parental rights by the state because of abuse or neglect. Today, however, child custody issues arise primarily as a result of divorce.

When parents divorce, decisions must be made regarding who has the present and future legal decision-making responsibility for the child's well-being, where the children will reside physically, and most important, what postdivorce relationships their parents will or will not be permitted to have with their children. Custody determinations set the framework that structures post-divorce life for parents and children as well as child support.

From a life-span developmental perspective, the major shortcoming of custody determinations is that they are static. They fail to acknowledge that all members of the family triad—fathers, mothers, and children—will have different postdivorce developmental trajectories that cannot be known at the time of divorce, are guaranteed to occur, and will require future modification for the best interests of all parties. Family law must come to recognize that change is inherent to development at all stages of the life cycle and make custody modifications both readily available and affordable for families at all income levels.

DEFINITION

Joint custody arrangements typically refer to two quite different types of custody. *Joint physical custody* focuses on which parent the child is with, where they are with each parent, and the amounts of time they spend with each parent. *Joint legal custody* focuses on which parent has what legal rights to make what kinds of decisions concerning which aspects of the children's life and well-being.

It is difficult to ascertain accurately who gets what kinds of custody because each state has different laws, different terminology, different court practices, and different reporting procedures. Thus, our focus will be on the advantages and disadvantages of two custody arrangements for each family member. Each family member will be considered because a core reality of divorce—unless a parent is willing to abandon their children—is the focus on *changed* relationships between former spouses rather than a "clean break."

WHO GETS CUSTODY

The most powerful determinants of who gets custody are the *presumptions* embedded in state divorce law and the ideologies of individual judges because they determine the starting point for divorce deliberations and often the end point as well. Historically, if one goes back far enough, the presumption embedded in oppressive patriarchy was that the children belonged to the father. Later, the family law pendulum swung 180 degrees toward an oppressive matriarchy presumption favoring mothers, which was embedded in either the "tender years" or "primary caregiver" doctrines. The tender-years doctrine *presumed* that children belonged with their mothers, whereas the primary-parent doctrine *presumed* that the parent who engaged in the most caregiving activities during the marriage would make the best postdivorce parent. Under these presumptions, family court judges virtually always gave sole physical and legal custody to mothers.

More recently, these doctrines have been replaced by the "best interest of the child" standard that, unfortunately, represents nothing more than "the eye of the beholder." Tragically for children, this standard gives family court judges unbridled latitude to reach any determination they wish as long as they proclaim that it is in the best interest of the child.

At this writing, the pendulum has swung back to dead center with the presumption of joint custody in, of all places, Iowa. Effective July 1, 2004: If joint legal custody is awarded to both parents, the court may award joint physical care to both joint custodial parents upon the request of either parent. In signing this legislation, Iowa Governor Tom Vilack emphasized the importance of having two parents following divorce based on his own experience as a child of divorce and his reading of the divorce literature. From a developmental perspective, this presumption offers the advantage of beginning divorce deliberations from a position of equality for all parties and deviating from this position only based on the individual difference characteristics, capacities, and situations of individual mothers, fathers, and children.

WHAT ARE THE ADVANTAGES AND DISADVANTAGES OF SOLE AND JOINT CUSTODY ARRANGEMENTS?

The advantages and disadvantages of sole versus joint custody arrangements are fairly straightforward. The advantages of sole maternal custody with paternal visitation are as follows. For the child, there is a sense of residential, neighborhood, and school stability perhaps paid for by a sense of paternal abandonment and a loss of the father as a parent. For the mother, there is virtually total control over the child and their socialization along with an exclusive and emotionally intense relationship with her child. The maternal disadvantage is potential burnout as she works the "second shift" of both paid employment and full-time 24/7 on-call child care. This burnout may be exacerbated if the child develops behavior problems as a consequence of the reduced involvement or absence of the father. For the father, there is a sense of loss and a loss of meaningful contact with his children. To become a visitor in his child's life, after having been an involved father with a meaningful father-child relationship, has many negative outcomes for the father, including substantially higher rates of suicide, depression, alcohol abuse, drug abuse, poor heath, work problems, relationship problems, and social isolation. The core argument is that postdivorce father-child relationships are of critical importance not only for the well-being of children but also for the well-being of fathers.

In joint physical custody, for the child there may be residential, neighborhood, school, and friendship network instability with transfers from one home to the other. This instability may or may not be compensated for by the gain of meaningful, everyday relationships with both the mother and the father and the avoidance of a sense of abandonment and loss of either parent. For the mother, there is the loss of an exclusive relationship with and total control over her child, which may or may not be compensated by a loss of maternal role burnout, the gain of likely enhanced mental health of her child, and a greater opportunity to move on with her own life as an adult woman. For the father, there is an opportunity to maintain a meaningful and nurturant relationship with his child and enhance his own emotional balance.

WHAT CAN RESEARCH TELL US ABOUT CUSTODY DETERMINATION?

There is an inherent and confounding fatal flaw to all custody-outcomes research—self-selection. Neither parents nor children ethically can be randomly assigned to different custody arrangements to do a true experiment. Thus, it is not possible to ascertain the independent contributions of the "before"

individual differences of mothers, fathers, and children that led them to choose joint custody and the "after" consequences or outcomes of having experienced joint custody.

Within this limitation, however, there are two lines of research that suggest Iowa may be on the right track. First, studies undertaken in Arizona and Florida report that young adult children of divorce wanted more time with their fathers (more custody time) and more emotional quality time (companionship, sharing activities, leisure, fun, play) than young adult children from intact families. Second, literature reviews uniformly conclude that gender similarities are far greater than gender differences in a parenting capacity. Mothers and fathers, in short, make equally competent parents. What makes these findings striking is the fact that this empirical research has rendered wrong and overruled decades of false legal presumptions.

SUMMARY

Today, both joint custody and child support are highly controversial social and legal issues. Both are in flux, both will change, and both have clear sides. Generally speaking, children and fathers of divorce perceive their best interests to be best served by joint legal and physical custody. Some mothers also see it this way, but other mothers see their interests as best served by sole legal and physical custody. Custody battles are not likely to disappear, but their costs to all parties involved appear to be best mitigated with the equal opportunity principles embedded in joint legal and joint physical custody presumptions.

—Gordon E. Finley

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JUDAISM

The term *Judaism* generally connotes the religion practiced by the Jewish people. Many, however, ascribe to it a much broader definition, most accurately as "a way of life" encompassing the expressed heritage of wisdom and creativity of the Jewish people, and subsuming such modes of expression as (nonsacred) literature, music, and graphic art. Here we will limit our discussion of Judaism to the religion of the Jewish people, speaking of it on both the horizontal (more or less contemporary) plane and on the vertical plane of its historical evolution.

Judaism might more properly be called the *Religion of Israel* (as did the renowned scholar of Judaism, Ezekiel Kaufman, in his magnum opus by that title). The term Judaism more accurately refers to a later title for the religion of an ethnic group that was the majority population in the geographic region that first became called Judah in Hebrew Scriptures, that area having been designated by Moses as the divine allotment for the tribe of Judah. Nearly a dozen more allotments were simultaneously designated for other tribal members of the tribal confederacy of the people of Israel, who were the descendants of the clan of Jacob—son of Isaac and grandson of Abraham, and often referred to as the *Israelites*—and who had later become mighty in number during their four-century sojourn in Egypt. Sometime after the Mosaic allotment, the tribes banded into a single polity under David as monarch, only to relatively quickly coalesce into two kingdoms—the northern called *Israel* and its southern counterpart *Judah*—following the death of his son, Solomon. When the northern Israelite kingdom was overrun by the Assyrians in 722 BC and its inhabitants exiled to Assyria, they ostensibly were forcibly assimilated, ultimately losing their ethnic

(and religious) Israelite identity; hence the popular term "the Ten Lost Tribes" of Israel. The southern kingdom at that time was able to ward off the Assyrian invader and remained intact until 586 BC, when it was overrun by the Babylonian tyrant Nebuchadnezzer. Like its brethren to the north a century and half earlier, its inhabitants—virtually all from the tribe of Judah (along with a substantial number of Levites, who being custodians of the religious cult were never given their own tribal allotment and therefore lived spread among the various tribes)—were exiled northward. Unlike members of the exiled northern Israelite kingdom, however, they maintained their identity and, after Nebuchadnezzer's dynasty was displaced by the Persian Cyrus some 60 years later, eventually were allowed to return to their homeland in Judah. Many returned and rebuilt their central religious shrine, the Holy Temple. Coupled with the disappearance of the northern kingdom, the restoration of Judah—albeit as a vassal of Persia—probably represents the point at which the Israelites became better known as "the Jews" and when the "religion of Israel" permanently took as its new name "Judaism."

BELIEF SYSTEM

Judaism professes the belief in one God, who calls on believers to practice a system of ethics emanating from a body of wisdom called Torah. Belief and practice originated about 4,000 years ago in the lives of the patriarch Abraham and his wife, Sarah, whom God called to venture forth from their home in Mesopotamia to go to "the Land that I will show you"—the land of Canaan, which has been known ever since as "the Promised Land." God soon brought Abraham into a covenant, calling on him to rear his not-yet-born offspring in righteous ways; thus was initiated an ever-accumulating spiritual heritage, which has come to be known as *ethical monotheism*.

The next major stage of religious development took place a half millennium later, in the time of Moses, when, according to the Biblical record, God rescued Abraham's descendants—who had lately been fruitful and multiplied—from Egyptian servitude. Once free, God brought the entire people—by scriptural estimates, some 2 million souls—into a new covenant at Mt. Sinai, revealing Himself while giving the Ten Commandments, which He later inscribed on stone tablets and gave to Moses to bestow on the people. In its most basic understanding, the new covenant provided mutual consideration: from God to the people of Israel, the land of Israel; from the people of Israel to God, performance of the mitzvoth—the Commandments.

Since that time, Judaism has taught that it is incumbent on members of the covenant—all Jews 13 and older (see entry on Bar/Bat Mitzvah)—to scrupulously adhere to practice of the mitzvoth, which can be broken into two main categories: ritual and ethical. (With the advent of Reform Judaism some century and a half ago, Reform Jews have placed the main focus on ethical commandments.) From a theological standpoint, performance of the mitzvoth is said to ensure the additional reward (besides the Promised Land) of material security, not to mention spiritual gratification. In reality, it has come to be understood that such assurance is fraught with problems, attested to by an ethnic history replete with a litany of disasters. Nor are large-scale episodes the problems of theodicy.

Nevertheless, at least at its outset, Jewish theology was held to be a significant advance beyond the polytheistic notion not just of many gods but of an arbitrary primordial realm held responsible for bad things happening to good people (and vice versa), to borrow a phrase from the title of Rabbi Harold Kushner's timeless book on the subject. Jewish religious thought was a breakthrough in that it claimed that human behavior produces the properly commensurate divinely ordained outcome: Virtue is appropriately rewarded and vice likewise punished. So promises Scripture at its most direct, especially Deuteronomy 11.

SACRED LITERATURE

One often hears Jews referred to as "People of the Book." Justifiably. From its inception, Judaism has been a "book religion." Its earliest collection of sacred literature is, of course, the Bible. Fundamentally, Judaism teaches that the Bible is the word of God. Many Jews, albeit the minority nowadays, believe every word of the Bible is divine in a literal sense. Others hold that the Bible as it stands is propositional—that is, divinely inspired. Others still would refrain from claiming any supernatural involvement in the Bible, describing it as the product purely of human creativity. No matter, all agree that it represents the earliest written collection of sacred literary accounts stemming from the Israelite/Jewish religious impulse to seek the Divine.

The Hebrew Bible consists of some two dozen separate books, varying according to the historical context, voice, and theme. On a larger scale, the Bible is divided into three main sections: the Pentateuch, the Prophets, and the Holy Writings. The first letter of each section in Hebrew forms the Hebrew name for the Bible, the TaNaKh. It is worth noting that of the three, Jews most venerate the Torah, which is chanted in synagogues in its entirety each year, following a format of weekly sequential portions. Additionally, in terms of Jewish law, the Pentateuch carries an authority that by far exceeds that of the two other sections of the Hebrew Bible.

Alongside the Bible in Sacred Literature is the Talmud. Unlike the Bible, the Talmud originated and long remained oral in character, giving the evolving Jewish religious tradition enormous flexibility and dynamism during a period of a millennium or more, up to its publication in approximately 500 AD. There are actually two Talmuds, the Babylonian and Jerusalem versions, which, although they bear much resemblance to each other, are nevertheless discrete collections. Of the two, the Babylonian version is the more popular, as well as more legally authoritative. The Talmud consists of two types of literature: law and lore. It no doubt is best known as a compendium of religious law and is especially noteworthy for its invariable penchant to include the extensive jurisprudential argumentation involved in discoursing most issues of Jewish law.

Because of its popularity (even outside the Jewish world) of late—literally in the past several years—we would be remiss not to mention the existence of a substantial body of mystical literature among Jewish sacred literature. Best known by its generic term, *kabbalah*, the Jewish mystical tradition is built around a sizeable collection of literature called the *Zohar*. Tradition holds that the Zohar is the outcome of a 12-year experience of divine revelation received by Rabbi Simeon bar Yohai and his son, while hiding in a cave during the Hadrianic persecution in Judaea some 1,800 years ago. This tradition further holds that, once received, the revelation remained mostly dormant for another thousand years, until finally being brought to light by the Spanish Rabbi, Moses de Leon. The Zohar and much other kabbalistic literature derive their purported mystical powers and properties through the application of an exceedingly esoteric symbolic system based on a scheme of types and degrees of combinable divine emanations, decipherable from kabbalistic literature by only highly trained mystics. Because of the extensive background required—not to mention the purported potency of the religious experience kabbalah can unlock—it has popularly been held that no one is permitted to delve into kabbalah before the age of 40.

HOLY DAYS

Foremost among Jewish holy days is the Sabbath, thought to be an Israelite innovation. Jews celebrate the Sabbath each Friday night and Saturday as the weekly anniversary of God's resting after 6 days of creating. In addition to refraining from labors, Jews join together for special prayers and meals. Some Jews refrain from using most kinds of technology, such as electricity and automated travel. The Sabbath is the Jewish holy day, par excellence.

Next in importance among Jewish holy days is a twofold observance consisting of Rosh Hashana (New Year) and Yom Kippur (the Day of Atonement), which fall 10 days apart and form a conceptual unit of a season for repentance. Traditional Jews celebrate Rosh Hashana over a 2-day period, as with the Sabbath reciting special prayers for the day and eating festive meals. Yom Kippur is a 1-day observance whose most outstanding characteristic is a full-day fast, refraining from all food and liquid. Many Jews wear a special white robe symbolizing purity on this day, and also refrain from wearing leather shoes, which symbolize comfort. Additionally, Yom Kippur features the largest array of special prayers for any holy day, many Jews spending the better part of the day in synagogue in prayer. The theology behind this holy period, known as the Days of Awe, was laid down in the Torah as a time of judgment, when the Almighty decrees the fate of each Jew during the new year. Hence, the period's emphasis on repentance, which along with prayer and good deeds forms the triumvirate of prescribed activities for this 10-day period.

During the nearly millennium-long period when the Holy Temple stood in Jerusalem (from roughly 950 BC to 70 AD, with an interruption between 586 and 512), Jews celebrated Judaism's three pilgrimage festivals—Passover, Shavuot (Pentecost), and Sukkot (Tabernacles)—by making pilgrimage to that central religious shrine. The practice was discontinued for obvious reasons after the Holy Temple was destroyed. (Although the Temple was never rebuilt, Jews have

continued to venerate the site, specifically the Western Wall of the mount on which it was erected.) The three pilgrimage festivals form a conceptual unit on an agricultural theme. Passover marks the earliest point of harvest, when barley ripens. Shavuot celebrates the fructification of other produce and, while the Holy Temple was standing, called on worshippers to bring "first fruits" to the altar. Sukkot is the full-blown harvest festival, celebrating the bounty of produce realized at the end of harvest. Passover and Shavuot also have historical and theological facets equally important to their agricultural significance. Passover famously commemorates the Exodus from Egypt, and Shavuot recalls God's revelation and bestowal of Torah at Mt. Sinai exactly 7 weeks later.

Each of the three pilgrimage festivals is celebrated in a unique way. Two of them, Passover and Sukkot, are weeklong festivals, featuring a Sabbath-like holy day on each end. Sukkot's end-day is a self-contained holy day called Shemini Atzeret, which marks the end of the entire pilgrimage festival season for a given year. Shavuot, on the other hand, is a daylong holy day. Among the unique aspects of Passover is a special diet for the week, eschewing ingestion of foods and liquids that have gone through the process of leavening. The most notable Passover food is matzoh, an unleavened cracker bread reminding Jews that their ancestors fled Egypt before giving their dough time to rise before baking. Passover's other notable characteristic is the popular Seder meal, usually celebrated in each family household, which retells the story of the Exodus through food and recitation of a special liturgy called the *Haggadah*. Whereas Sukkot doesn't impose any dietary changes, it does call for each household to construct a special booth, whose roof must be made from natural material, usually wood branches and leaves, so as to remind Jews of the simple structures their ancestors used in the Sinai wilderness. Jews eat their meals in these booths throughout the Sukkot festival week. Additionally, during Sukkot, Jews make use of a four-species collection comprising a palm branch, willow and myrtle branches, and a citron bound together for purposes of waving before God during prayers. This ritual thanks the Almighty for the blessings of nature's beauty and bounty.

LESSER HOLIDAYS

Unlike the major holy days, Judaism's lesser holidays are "later developments," insofar as they are not part of the divine legislation of the Pentateuch. Best known of these lesser holidays (likely because it falls on or around Christmas) is, of course, Hanukkah. Hanukkah is an 8-day holiday commemorating the rededication of the Holy Temple, following its occupation and desecration by Hellenists in 165 BC. Often called the *festival of lights*, Hanukkah's primary observance entails the kindling of a candelabrum called a *menorah*, beginning with one candle for the first day and adding a candle on each successive day until eight are lit. (Practically speaking, there are nine because an extra candle is lit each night as the shammash, or guardian candle.) The eight candles follow the 8 days of Hanukkah, whose length comes from the legend that, when the Holy Temple was rededicated, the quantity of holy oil found for the Temple's candelabra was enough for just 1 day, but miraculously lasted 8 days. Many Jews celebrate Hanukkah by eating fried foods—a reminder of the miracle of the oil—such as potato pancakes and jelly doughnuts. Jewish children play a game with a special spinning top called a *dreidel*. In many families, children are given monetary gifts by their parents.

Although not nearly as widely known by gentiles as Hanukkah, the holiday of Purim is at least as significant in Jewish life. Purim is a 1-day holiday celebrated each year, usually in March, which commemorates the salvation of the Jews of Persia from annihilation some 2,500 years ago. The central observance of Purim is the communal cantillation of the Bible's Book of Esther in its entirety (a half-hour-long ritual), accompanied and followed by merriment and gaiety. Some Jews consume food and alcohol in abundance. Jewish children usually dress up in costume, often playing one of the principal characters of the Purim story, Esther or Mordecai—some even come dressing as the villain, Haman, whose name, incidentally, inspires jeering from the community while the Book is being chanted. Purim observances also include the exchange of food gifts, as well as mandatory gifts to the poor.

Other minor holidays can be briefly noted. Jewish arbor day, Tu b'Shvat, is marked each year in January or February, coinciding with late winter in Israel. This is the birthday of trees in the Land of Israel, when sap starts to rise. Jews mark this holiday by buying trees for planting in Israel. Some hold a special Seder meal, similar to the Passover Seder, featuring foods and wines native to Israel. Next, ever since the destruction of the Holy Temple, the Jewish calendar has featured

3 days of fast, marking the progression of ruin to Jerusalem during the two periods of destruction, first in 586 BC and then in 70 AD. Each fast day falls on the anniversary date of a significant stage in the impending ruin. The first, the 10th of Tevet, marks the beginning of siege; the second, the 17th of Tammuz, marks the breach of the city walls; and the final, the 9th of Av, marks the actual destruction of the Holy Temple. Whereas the first two are so-called minor fasts, insofar as they obligate fasting from only sunrise to nightfall, the 9th of Av is one of Judaism's two major fasts (it will be recalled that the other is Yom Kippur), calling for a full-day fast, lasting from the beginning of twilight 1 day until nightfall the next. The 9th of Av—usually called *Tisha b'Av*—also calls for the chanting of the Bible's Book of Lamentations, alongside with a litany of poetic dirges composed through the ages in commemoration of the black day.

Finally, a relic of what once was a much larger holy day celebration: Rosh Hodesh, or the New Month. In the days of the Holy Temple, Jews celebrated each Rosh Hodesh as a Sabbath-style holy day. Since its destruction, celebration of this occasion has been greatly reduced, to the point at which the only significant departure from an ordinary day is a fairly small segment of additional liturgy, coupled with a short chanting of scripture associated with the day.

JEWISH PRACTICE

The Jewish religion is structured around a system of Mitzvot—divinely ordained behavior, stemming from Scriptures, principally the Pentateuch. Several of these Mitzvot are especially notable and will be discussed herewith, in no particular order of importance.

Jewish dietary practice, known as *kashrut* (or, "keeping kosher"), is in essence a conglomeration of several Mitzvot. They can be briefly delineated as follows.

Forbidden Species

Best known in this category is the prohibition against consuming pork products. Along the same lines, Scripture forbids the eating of shellfish—that is, any fish not having both fins and scales. The Pentateuchal books of Leviticus and Deuteronomy also have extensive lists of various forbidden birds and insects. Finally, consumable beasts must both chew their cud and have cloven hooves.

Ritual Slaughter

Consumable land and flying animals require ritual slaughter—shehitah—by a certified practitioner. Ritual slaughter entails taking animal life by slicing open the jugular, preceded by a special blessing. Following shehitah, the carcass is inspected for signs of lethal disease; if such signs turn up, the carcass is declared nonkosher.

Forbidden Mixtures

Thrice the Pentateuch adjures, "Thou shalt not boil a kid in its mother's milk." Scriptural interpreters extended this prohibition to include all admixtures of milk and milk by-products with beef or fowl. Additionally, kashrut requires an interval wait of several hours (how many varies among communities) between the consumption of milk products and meat products. Most Jews who adhere to prohibitions against forbidden mixtures retain completely separate implements for storing, preparing, cooking, eating, and cleaning after milk products on the one hand, and meat products on the other. Again, it must be noted that, because Reform Judaism teaches that many rituals are optional, few Reform Jews keep kosher.

Traditional Jewish prayer is structured around an inherited liturgy, as well as certain mandated junctures of the day, and additionally in certain situations. Not to be overlooked is the fact that, outside Reform Judaism, Jewish prayer takes place nearly uniformly in Hebrew. The Jewish day comprises three unique liturgical services: morning, afternoon, and evening. Among the main elements, common to each service is the Amidah, or standing prayer, which, aside from the Sabbath when it is considered unfavorable to make requests of God, is a sequence of very ancient blessings on themes of thanks and request. Morning and evening services also have in common a three-section affirmation of faith, known as the *Shema*. (This prayer contains the most famous line of prayer in all of Judaism, "Hear O Israel, the Lord is our God, the Lord alone.") Especially important is to note that Jewish teachings place the highest value on community prayer. A prayer quorum consists of 10 or more Jews aged 13 and older. (In Orthodox Judaism, as well as some conservative synagogues, only Jewish men may count toward a quorum.) As for prayer garb, Jewish men don skull caps and prayer shawls (for morning prayers), as well as special phylacteries for the arm

and forehead called *tefillin*—all of which are optional in Reform circles. It is preferable, though not strictly necessary, for community prayer to take place in a synagogue or any other space with a Holy Ark containing a Torah scroll. In Orthodox Judaism, men and women pray separately. Beyond prayer services, Judaism has prayers for myriad special and mundane (such as after using the restroom) occasions, known as blessings or in Hebrew, *berakhot*. Best known blessings include those over eating bread and drinking wine.

In its lengthy history, Judaism has developed a sequence of Rites of Passage, herewith described.

Jewish males require ritual circumcision at 8 days old. The ceremony is called *Brit Milah*—often elided to *bris*—and usually is performed by a trained functionary called a *mohel*. Conceptually, the ceremony brings the baby boy into God's covenant. This rite goes all the way back to the patriarch Abraham (who, it will be recalled by those familiar with Scripture, circumcised himself). The Brit ceremony also bestows the child's Hebrew name. Although no such covenant ceremony was prescribed either in the Bible or Talmud for girls, modern Judaism has begun exploring ceremonies for baby naming and covenant invoking.

Judaism's puberty rite is the Bar and Bat Mitzvah at age 13.

Judaism's concept of marriage has been thoroughly monogamous since 1000 AD, when the illustrious Sage Rabbi Gershom issued an edict forbidding polygamy. Marriage in Judaism is a holy covenant between husband and wife, affected by a formal marriage ceremony built around legal acquisition through witnessed ring exchange. In Judaism, marriage may be brought to an end through divorce, although implementing divorce is somewhat more complicated than marriage (owing to Judaism's reluctance that marriage end except in completely irreconcilable circumstances), requiring that a divorce decree (in Hebrew called a *get*) be handwritten by a licensed scribe while two valid witnesses watch, then delivered to the wife by a specially designated emissary. Once again, it is necessary to add that Reform Judaism by and large has done away with the requirement of the traditional divorce procedures, recognizing in their stead civil divorce decrees.

Finally, when a life ends, Judaism has a highly developed set of rituals regarding burial and mourning (bearing in mind again that Reform Judaism has declared optional most if not all traditional rites associated with death). Jewish law requires that, except in extenuating circumstances, burial take place as soon as possible after death, usually the next day (unless that day is a holy day). In Jerusalem, burial often takes place on the same day as death, often within just a few hours. The reasoning behind such insistence on quick burial stems from the concept of *kvod ha'met*—or, "honoring the deceased." According to Jewish law, cremation is forbidden, and burial must take place underground (rather than in an aboveground vault) unless local ordinances require otherwise. Mourning practices include a 7-day period of cessation from all workday pursuits, known as *shiva*, and shaving and cutting hair is frowned upon for an additional 23 days. The entire monthlong period is called *sheloshim*. A person is designated a mourner for purposes of the above rituals upon losing a direct relative—parent, spouse, sibling, or child. Perhaps the most well known of mourning rites is the "mourner's kaddish," an Aramaic prayer recited by mourners at public prayers during the sheloshim period and during an additional 10 months following the loss of a parent.

A word about afterlife in Judaism: Unlike many Christian traditions, Judaism does not place enormous emphasis on the speculative realm of afterlife. Judaism lacks a clear, unambiguous concept of heaven and hell—hence its emphasis on perfecting the here and now. Nevertheless, traditional Jewish thought long ago developed a notion of life after death, featuring a singular notion of bodily resurrection followed by final judgment, and only then subsequent eternal reward. In this conceptual framework, body and soul die and are resurrected together, then part ways only after final judgment, when worthy souls live with God for eternity.

THE SYNAGOGUE

Jewish communities have long erected facilities for prayer, fellowship, and learning. Usually called *synagogues*, in the early 20th century some—most Reform—congregations began calling their structures *temples*. In either case, the focal point of the synagogue is the chapel or sanctuary, within which lies the Holy Ark, which houses the community's Torah Scrolls—handwritten on parchment by a trained scribe. Most synagogues have an educational arm and administrative area, along with a banquet facility. Some also have a ritual bath, used for conversion and purity purposes.

MODERN DENOMINATIONS

The Jewish religion today consists of four primary denominations, one of which is further subdivided into various self-segmented groups. Denominational distinctions began to emerge in Germany in the mid-19th century, when several traditionally ordained rabbis banded together to commence a project of reformation. Their ideas and followers coalesced into a formal movement, Reform, and soon established a growing body of leaders and synagogues. Among their major reforms were de-emphasis of ritual law, removal of Hebrew as the main language of prayer, and repudiation of the hope of return to Zion.

Amidst the early move to reform, some rabbinical leaders felt uncomfortable with the pace and degree of recommended reforms. So began an incipient counter-reformation movement, which came to be known as *Conservative Judaism*. Likewise, at about the same time, leading traditional rabbis who opposed altogether any major reforms began calling themselves *orthodox*. Thus was born the term *Orthodox Judaism*. It should be noted that, whereas Reform and Conservative Judaism are considered "movements" (a concept subsumed within their names), Orthodox Judaism never has considered itself as such.

Nearly a century after Reform and Conservative Judaism emerged, in the early 1960s, a fourth denomination—Reconstructionism—was born in America from the thought of Rabbi Mordecai Kaplan, whose most notable innovation was a thoroughly naturalistic concept of God. Like its counterparts, Reconstructionism has its own synagogue arm and seminary but remains substantially the smallest of the four denominations. Orthodox is the next largest (in North America), followed in order by Conservative and Reform, which, until recently, were at virtual parity in affiliation. Reform has eclipsed Conservative Judaism in the past decade or so, probably owing to its more liberal definition of Jewishness. To elaborate, in an atmosphere where the intermarriage rate exceeds 50%, Reform Judaism is at an advantage in that it holds that Jewishness is passed to children through either parent, as opposed to the Orthodox and Conservative traditional position that it comes from the mother only.

As mentioned earlier, one denomination—Orthodox—is further subdivided in several ways, most noteworthy by a split between Hasidic (pious ones) and non-Hasidic (often referred to by the Hebrew term, *Mitnagdim*, or opponents). This split occurred in mid-18th century Eastern Europe, after the advent of a charismatic leader affectionately known as the *Baal Shem Tov* (Master of a Good Name). Unlike its counterpart, Hasidic Judaism revolves around the charismatic leadership of several dynastic "Rebbes," and such leadership almost invariably passes from father to son. Hasidic Judaism is even further subdivided into dozens of sects, each with its own dynastic leader. Within the Mitnagdim, Orthodoxy is likewise further subdivided along the lines of Modern Orthodox and Ultra-Orthodox, each group having its own set of seminaries, synagogues, and international leaders. Among the primary differences between Modern and Ultra Orthodox are appearance and mode of dress; Ultra-Orthodox men invariably wear long beards and black clothing. Ultra-Orthodox Jews also are more prone to live in insular enclaves, isolated as much as possible from the outside world. A notable exception among the Ultra-Orthodox is the Chabad Movement, whose recently deceased charismatic leader urged his followers to spread out in the world and missionize among Jews, hoping to attract followers.

THE 20TH CENTURY AND BEYOND

Judaism underwent two major upheavals in the 20th century, the first tragic and the second triumphant. The first, the Holocaust, resulted in the death of 6 million European Jews, murdered by the Nazis between 1939 and 1945. The Holocaust has had an inestimable impact on Jewish thought in the second half of the 20th century, which no doubt will carry over into the 21st and thereafter. Jewish thought has struggled to integrate the staggering loss of fully one third of world Jewry into its theology. A number of prominent Jewish theologians, among them Rabbi Harold Kushner, propounded a radical and controversial theology many say represents a return to the idea of a realm beyond God's control. Alternatively, many others, including survivor Elie Wiesel, suggest that the only appropriate response to the theological problem posed by the Holocaust is silence.

Triumphantly, only 3 years after the Holocaust ended, the State of Israel was born, representing the culmination of more than a half century of effort by the Zionist Movement, formally initiated by Theodore Herzl in 1897. Although its first six decades have been little other than struggle for acceptance and survival, the existence of Israel has provided a "shot in the arm"

to a Jewish world devastated by the Holocaust. Since the birth of the Jewish state, fully one third of world Jewry has relocated into the Jewish state, whose Jewish population now exceeds 5 million.

Despite the lessons of the Holocaust, anti-Semitism unfortunately continues to rear its ugly head in some quarters. At the time of this writing, French Jews, numbering some 600,000 and Europe's largest Jewish community, have seen a dramatic upsurge in anti-Semitic incidents in the past half decade, leading several thousand to depart each year for haven, mostly to Israel. Equally troubling, many quarters of the Muslim and Arab world, although virtually bereft of Jews, have recently begun to spout an especially virulent type of Jewish hatred, blaming them for many of the ills affecting their societies and even harking back to the medieval blood libel—the accusation Jews murder children to use their blood for ritual purposes.

In the United States, which still houses the world's largest Jewish community, the concern is not anti-Semitism; rather, it is assimilation. Now in its fifth generation since the great migration of some 2 million souls from Eastern Europe, U.S. Jewry is showing signs of erosion. More than 50% of Jews getting married marry non-Jews. Many century-old Jewish communities in smaller cities are deeply on the wane. Still, Judaism has many pockets of great vibrancy. Judaic studies programs at major universities are on the rise and increasingly popular. Books on Jewish subjects are published by the hundreds each year and eagerly read by thousands. Many once-lapsed Jews are returning to the fold, in some cases composing the bulk of entire synagogue communities.

"Ahm Yisrael Chai"—The age-old tradition lives on.

—Scott White

See also Anti-Semitism, Bar/Bat Mitzvah, Holocaust, Religion

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JUVENILE DELINQUENCY

Juvenile delinquency has traditionally been defined as behavior exhibited by children and adolescents that has legal ramifications, such as engaging in illegal activity (statutory and criminal). Juvenile delinquents include youth who have contact with law enforcement and those who are adjudicated through juvenile court for a crime. These are behaviors that violate the rules of a society and result in contact with the juvenile justice system. Originally, the juvenile justice system was created as a separate entity from the adult legal system in recognition of the developmental differences between children and adults. As such, the juvenile justice system was primarily concerned with early intervention and rehabilitation of children and adolescents. It is generally acknowledged, however, that the system has become more punitive, which has led to increasing calls for reform of the system. For example, the U.S. Surgeon General has recently asked that youth involved in delinquent behavior be identified appropriately and that empirically validated treatment programs be implemented with them and their families.

INCIDENCE

Rates of delinquency are often underrepresentations of actual behavior. Because most statistics rely solely on official contacts with law enforcement, all other illegal activity that is undetected remains unreported. To enhance information obtained from official records, self-report data from children and adolescents have become a beneficial component of juvenile delinquency research. Arrest rates for violent crimes, including criminal homicide, robbery, aggravated assault, and forcible rape, increased from 1983 to 1993–1994. Factors hypothesized to have played a significant role in this increase were youth involvement in gangs, increased drug use, and access to and use of guns. Data from 1993 to 1999 have shown a decline in arrests. The overall arrest rate for all crimes committed by juveniles was 2.4 million in 1999. During this time period, juveniles

were involved in 16% of all violent crime arrests and 32% of all property crime arrests. Another indicator of juvenile violence, self-report of crime, showed no decrease in the amount of violent behavior between 1993 and 1999. One potential reason for this discrepancy between arrest rates and self-report of problem behavior may be that there has been a decline in youth's use of firearms and some decline in gang membership that has resulted in less severe problem behavior that may not be detected by the authorities. Other statistics show that 30% to 40% of boys and 16% to 32% of girls have committed a serious violent offense by the age of 17. There are differences in arrest rates across gender and race, with significantly more boys than girls arrested and significantly more African Americans arrested than whites or other minority groups.

RISK AND PROTECTIVE FACTORS

Research examining risk and protective factors involved in juvenile delinquent behavior has typically focused on four core domains: individual, family, peer, and school/community. A summary of key risk and protective factors for each domain is presented in Table 1.

Table 1 Risk and Protective Factors Associated With Delinquent Behavior in Juveniles

Domain	*Risk Factor*	*Protective Factor*
Individual	Low intelligence Early problem behavior Substance use Hyperactivity/risk taking behavior	High intelligence Prosocial behavior
Family	Poverty Abusive parents Antisocial parents Poor parent-child relations	Parental monitoring Supportive, nurturing relationships with parents/adults
Peer	Antisocial peers Peer rejection	Nondeviant peers
School/ community	Poor academic performance Low academic goals Neighborhood disorganization Access to weapons	Commitment to school Involvement in prosocial activities

CORRELATES

Youth who display delinquent behavior often have significant co-occurring problems. Comorbid mental health disorders and substance abuse have been found to be more prevalent among delinquent youth, as well as early sexual activity, truancy, and school failure. Family correlates of delinquent behavior include family conflict, marital conflict, and parental inconsistency with rules and consequences.

ASSESSMENT

Assessments of children and adolescents who exhibit delinquent behavior are often court ordered and have a primary focus of assessing the youth's potential for future harm and his or her amenability to treatment. Evaluations are used to assist officials in planning probation requirements for the youth as well as potential placement decisions. A standard evaluation should assess the risk factors associated with future behavior, including past behavior, substance use, social stressors and support, opportunity to commit problem behavior, and characteristics of a future residence. In addition, there are several key areas that should be evaluated in order to accurately assess delinquents, including individual, family, peer, and community factors. Individual factors include the range of antisocial behavior, cognitive skills, and personality functioning of the youth. In addition, vocational skills may also be assessed to see how the youth may be able to adapt to his or her environment. Another important area is family dynamics, including parenting strategies, family conflict, and warmth. Deviant peer relationships are one of the best predictors of delinquent behavior and as such ought to be included in any assessment. Finally, community factors need to be considered, such as support systems for the youth and family, as does neighborhood cohesion or support of delinquent behaviors.

TREATMENT

Effective treatment of juvenile delinquents has historically been a challenge. During the past decade, however, several programs have been empirically validated for the prevention and treatment of delinquent behavior. In general, studies have shown that programs

targeting multiple systems that are short term, family based, and intensive are more effective in treating difficult behavior. Particular programs identified to show change in juvenile behavior and that are cost-effective include Functional Family Therapy, Multidimensional Treatment Foster Care, Multisystemic Therapy, Prenatal and Infancy Home Visitation by Nurses, and the Seattle Social Development Project. Unfortunately, many communities continue to fund programs that have not been shown to be effective, such as gun buy-back programs, boot camps, residential programs, milieu treatment, waivers to adult court, and individual counseling.

PROGNOSIS

Much research has been done on the risk factors and developmental trajectories for delinquent youth. Most of the research to date has identified two developmental pathways, including early-onset and late-onset problem behavior. Youths with early-onset delinquency are more likely to increase in severity of problem behavior over time and continue to engage in behaviors across adolescence and into adulthood. Risk factors have been identified by age and also across individual, family, school, peer group, and community domains (see Table 1). In addition, some protective factors have been identified that may assist youth in having a more positive outcome. Having a risk factor does not guarantee that a youth will develop problematic behavior, but the more risk factors that accumulate, the greater the likelihood that the individual will develop more severe delinquent behavior.

Researchers have identified three potential developmental paths of antisocial behavior. An *overt pathway* begins with minor aggression to physical fighting and then leads to violence. An *authority conflict pathway* moves from stubborn behavior to defiance and disobedience to authority avoidance. Finally, a *covert pathway* proceeds from minor covert behavior to property damage, more serious delinquency, and then serious delinquent acts. Further research will continue to delineate the factors related to persistence of delinquent behavior in order to strengthen our treatment of this population.

—Stephen R. Lassen

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K

Kindergarten Readiness

All I really need to know about how to live and what to do and how to be I learned in kindergarten. Remember the Dick-and-Jane books and the first word you learned—the biggest word of all—look.

—Robert Fulghum

KIBBUTZIM

The first kibbutz, a cooperative communal farming settlement called Degonia, was established in 1909 near the Sea of Galilee. It was followed in the 1920s by a number of variations on the basic model, and today there are more than 200 kibbutzim featuring a host of political and organizational characteristics and producing an array of goods, including toys, shoes, pharmaceuticals, and produce. Although there now exist a range of governmental organizations, there remains an effort to rule by committees, which oversee finance, education, child care, and other aspects of kibbutzim life. Nevertheless, the utopian socialist approach that underwrote the earliest kibbutzim has been largely diluted, leaving mixed forms of government, new labor practices including the use of hired laborers from outside of the kibbutz, and a host of new products bringing profits to kibbutz industries in ways that resemble conventional market dealings.

The original communal organization aimed to establish shared responsibility for administrative and labor tasks by promoting the idea that partnership and shared responsibility provide balance between the individual and the whole and between the whole and the individual. This was effected in part by equal sharing of all responsibilities and an obligation to take an active role in the life of the community under the credo of each man according to his ability and giving to a man according to his needs. The more utopian of the kibbutzim were established as Kibbutz Artzi by Hashomer Hatzair; these had their own individual and separate settlements but in 1927 joined the kibbutz movement to promote greater mutual aid and to provide a focus for the world organization. At its inception, the Kibbutz Artzi numbered four kibbutzim and 200 members, but as Hashomer Hatzair spread throughout the Jewish world, its impact began to be felt in Jewish communities everywhere, and new adult members emigrated to Palestine to join up. In 1937, the very first kibbutz of Americans was settled at Ein Hashofet, named in honor of Justice Louis Brandeis, a strong supporter of Hashomer Hatzair's objectives. On the eve of the Second World War, the Hashomer Hatzair youth movement numbered 70,000 members worldwide, and their kibbutzim promoted a vanguard of socialist ideals.

From a progressive social standpoint, the early kibbutzim sought to minimize arbitrary direction and release fundamental motives for individual expression, the latter releasing the motive of the intellectual curiosity and the former the motive of economic

cooperation. This emphasis on freedom and creativity, along with the ways in which the kibbutzim were isolated from mainstream culture, distinguishes this movement from others in existence during this period. The work carried out by those on Mishmar Ha'emek, one of the more representative of the utopian socialist kibbutzim, is indicative of the type of agrarian-based, socialist-style kibbutzim that was considered the ideal for that time. Indeed, the Kibbutzim Artzis were founded on a belief in the kibbutz as an instrument for fulfilling the Zionist ideal, furthering the class struggle, and building a socialist society. The objective was to promote the fullest possible development of all members of the group in order to advance the causes of rational planning, shared decision making, and the growth of individual well-being. The "maximum social effectiveness" of this type of organization was best demonstrated by the important successes it had for family life, the status of women, and the education of children. Concretely, these kibbutzim offered women an equal role in the administration and planning of the community, whereas children were provided the best available housing, hygiene, and health care, along with a progressive education.

For people from all over the world to get to know Israel, to learn Hebrew, and to get an understanding of kibbutz life, there exists the "Ulpan," a 5-month period in which members study half the week and work in a branch of the kibbutz for the other half. Kibbutzim also welcome "volunteers" who come from many different countries for varying periods of time to learn about the kibbutz by taking an active part in the social and work life of the kibbutz. To be part of the kibbutzim is also a way of life, captured by the idea of "to build and be built."

—Robert F. Barsky

See also Judaism

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KINDERGARTEN READINESS

Whether or not a child is "ready" for school has been a topic of considerable debate. In the past, maturational views of readiness, which advocate school entry only for those children deemed to be developmentally ready, dominated ideas about school readiness. According to this view, readiness for school is determined by children's level of biological development. A child who is developmentally young needs only extra time to develop those characteristics that define readiness. This view manifests itself in holding children responsible for acquiring skills and characteristics needed for a good fit with the school environment and the characteristics that will allow them to be academically and socially successful. More recently, there has been a call by organizations such as the National Association for the Education of Young Children (NAEYC) for schools to accept the responsibility for adapting to the needs of all children. This view posits that all children are "ready" for school; schools and teachers must accommodate children of varied learning and behavioral styles, maturational levels, languages, and cultures by adjusting instruction so that every child can succeed.

DEVELOPMENTAL SCREENING VERSUS READINESS TESTS

Two types of tests often associated with school readiness are developmental screening tests and readiness tests. Preschool children may be evaluated with either or both of these measures, which have very different uses. Developmental screening tests are designed to identify children who need further assessment and evaluation. After a developmental screening test shows reason for concern, the NAEYC suggests a child undergo a multidisciplinary assessment. Only after this assessment should placement decisions (e.g., into a "developmental" kindergarten or pre–first grade program) be made.

Readiness tests focus on a child's level of preparation for school in comparison with other children of similar age. The primary use of such information is to give teachers an understanding of the achievement levels of their students and improve their ability to plan instruction. The function of readiness tests should not be to sort children or advocate delayed entry for some children and school entry for others.

Neither the developmental screening test nor the readiness test should be used to make placement decisions, such as whether or not a particular child should attend regular kindergarten, should attend a

developmental kindergarten, or should have entry delayed. As stated earlier, such decisions require a multidisciplinary assessment.

DELAYED SCHOOL ENTRY

Concerns about children's readiness and perceived potential negative impacts of being the youngest in a class, as well as the maturational view of readiness, continue to exert influence on many parents' decisions to delay school entry. However, quality research shows that children who appear to be "immature" at school onset overwhelmingly catch up to their peers by second grade. Additionally, delaying entry has recently received more attention for the potential problems associated with it, including possible increases in children's behavioral problems and difficulties for teachers with classes where large variations in age exist.

SUMMARY

In summary, the most widely accepted notion of readiness among experts in early childhood education today is the view advocated by the NAEYC. Schools and teachers bear the responsibility of being ready to accommodate the needs of all children in developmentally appropriate classrooms. All children are ready to learn, although they may come to school with different experiences and capabilities. Parents should be encouraged to send their children to school on time, as per district guidelines. The goal of kindergarten testing and screening is for schools to obtain helpful information that will enable teachers to optimally serve their students, as well as allow schools to provide appropriate additional services to those children who require such services.

—Andrea M. Noel

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KINSEY INSTITUTE

The Kinsey Institute for Research in Sex, Gender, and Reproduction was founded as a not-for-profit corporation in 1947 by pioneering sex researcher Alfred C. Kinsey. The Kinsey Institute is a research institute affiliated with Indiana University. The Kinsey Institute's mission is to promote interdisciplinary research and scholarship in the fields of human sexuality, gender, and reproduction. The institute has research, archival, and educational components. Kinsey's landmark studies, published as *Sexual Behavior in the Human Male* (1948) and *Sexual Behavior in the Human Female* (1953), created the foundation for the institute and for modern sex research. The two books, known collectively as "The Kinsey Reports," included data from more than 11,000 interviews.

Integral to the mission is a research program that fosters diverse, creative approaches to significant questions in the field of sex research. The Kinsey Institute conducts research in various aspects of sexuality. Current topics include the study of high-risk sexual behavior, the effect of mood on sexual arousal and decision making, sexual well-being and distress in women, hormonal effects on sexuality, sex and the Internet, the psychophysiology of sexual arousal, condom use errors, and sexual compulsivity.

The Kinsey Institute initiates, cosponsors, and contributes to special events, exhibitions, lectures, and workshops and symposia that promote the interdisciplinary research and study of sexuality, gender, and reproduction at Indiana University and internationally. Workshops encourage useful discourse between researchers from different epistemological backgrounds and facilitate future interdisciplinary research on topics of pressing interest, such as methodology and theory in sex research. Visiting scholars add to the interdisciplinary dialogue.

The institute's extensive collections provide a resource for scholars in many different disciplines, including the arts, humanities, social sciences, natural sciences, medicine, education, and law. The library

houses more than 100,000 books, journals, scientific and scholarly texts, erotica, popular culture materials, and archival documents that span 2,000 years of human history. The collection includes monographs, journals, unpublished papers, reports, manuscripts, reprints, vertical file materials, sexual ephemera, erotic literature, microforms, audiotapes, phonograph records, CD-ROMs, and sex-related books, magazines, newspapers, and pulp fiction. The film collection includes historical "stag" and sex education films as well as contemporary videos and DVD collections. The library catalog, KICAT, can be accessed through the institute's Web site.

Historical and contemporary art and photography collections of the Kinsey Institute include more than 8,000 items from the United States, Europe, South America, Africa, and Asia and more than 75,000 photographs. The gallery displays selections from the collections. These diverse collections provide data for scholars studying sexuality across a wide range of academic areas of inquiry.

Through Indiana University, the Kinsey Institute codirects a graduate minor in human sexuality and a summer research institute, and it operates a sexual health clinic for people with problems in their sexual lives.

The institute's information services direct students, scholars, media, government officials, and the public to research-based information on a wide range of topics related to sexuality. The Web site provides information about current research and research publications, direct access to the library catalogue, information about events and services, and links to related resources on sexuality and research.

The Friends of the Kinsey Institute is an international organization created in 1997 to support the goals and mission of the institute. Monthly tours are offered of the institute collections. For more information, contact kinsey@indiana.edu.

—Jennifer Bass

See also Sex Education

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The Kinsey Institute, http://www.kinseyinstitute.org

KLINEFELTER'S SYNDROME

Klinefelter's syndrome is a male sex chromosome disorder affecting 1 in 500 males across all ethnic groups. Men with Klinefelter's syndrome possess an additional X chromosome, resulting in a 47,XXY genotype. The additional X chromosome comes from sporadic errors during sperm or egg formation. In an individual with Klinefelter's syndrome, the extra X chromosome forms a dense mass, or Barr body, within the nucleus of cells, but exactly how the presence of this extra chromosome leads to the characteristics of Klinefelter's syndrome remains a mystery.

Individuals with Klinefelter's syndrome have testicular failure, which results in impairments in both sperm and testosterone production. Klinefelter's syndrome can be diagnosed at almost any age: in utero (after amniocentesis), in a prepubertal boy, in a male adolescent, or even in an adult male presenting to a medicine or infertility clinic. Because testicular failure occurs before puberty, many of the normal developmental changes of puberty either do not occur or progress slowly. This leads to some typical adult characteristics of individuals with Klinefelter's syndrome, including tall height with long arms and legs, increased breast tissue (gynecomastia), decreased muscle mass, decreased facial and body hair, and small testes—which often measure less than 5 milliliters in volume (normally greater than 15 milliliters). The penis may be decreased in size but is often of normal length. Gynecomastia is variable but is often prominent and may require surgical correction. Infertility secondary to impaired sperm production is almost universal. In childhood, common presenting features can include delayed speech development, learning difficulties at school, and unusually rapid growth in middle childhood.

At one time, individuals with Klinefelter's syndrome were thought to be at increased risk for criminal behavior; however, these conclusions were based on flawed studies of preselected (usually committed or incarcerated) populations and are probably inaccurate. When tested, groups of individuals with Klinefelter's syndrome can exhibit deficits in language processing skills, including reading and spelling, verbal processing speed, judgment, and motor dexterity. In general, this leads to lower than average school performance. It is important to remember that individual variation in mental function is marked; some individuals with Klinefelter's syndrome perform well above average on

intelligence tests. Moreover, it seems likely that early developmental interventions and language tutoring in boys can assist in preventing disabling difficulties with language skills later in adult life.

Laboratory analysis of an individual with Klinefelter's syndrome reveals low or low-normal serum testosterone and elevated serum gonadotropin levels. The diagnosis is confirmed using chromosomal analysis (karyotyping), which usually reveals a 47,XXY genotype, although infrequently additional X chromosomes may be present or an individual may be mosaic (47,XXY/46,XY).

Testosterone therapy of individuals with Klinefelter's syndrome results in a more "male" phenotype, with improved mood and increases in facial and pubic hair, muscle size, strength, libido, and bone mineral density. Optimally, testosterone therapy is begun at puberty, allowing boys with Klinefelter's syndrome to experience pubertal changes in tandem with their peers. In addition, this allows for optimal enhancement of bone mineral density. Even if testosterone therapy is not initiated until adulthood, it is still associated with beneficial improvements in mood, behavior, and sense of well-being. Testosterone therapy has no beneficial impact on either infertility or gynecomastia, which are optimally treated with surgical resection if bothersome to the individual.

For most men with Klinefelter's syndrome, artificial insemination with donor sperm or adoption are the only options for fatherhood. Recently, however, new approaches to the treatment of infertility, including intracytoplasmic injection of sperm aspirated from the testes, have been reported for Klinefelter's syndrome patients and may be successful in the subset of patients in whom sperm are present on testicular biopsy.

—John K. Amory

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KOHLBERG, LAWRENCE (1929–1987)

Lawrence Kohlberg developed a landmark theory on moral development that has generated much research, application, and controversy in many fields. Kohlberg was born in Bronxville, New York, to a wealthy family and was educated in private schools. Facing the immorality of the Holocaust as a young man, he helped smuggle Jewish refugees from Europe. He enrolled at the University of Chicago and, because of his brilliance on admissions tests, earned his bachelor's degree in 1 year, continuing on to do graduate work in psychology.

Kohlberg was much influenced by works of Dewey and Piaget, particularly Piaget's views of moral reasoning and use of problems to ascertain children's thinking levels. Kohlberg's dissertation, published in 1958, proposed a six-stage theory of moral development, based on his study of 72 middle-class white boys in Chicago, expanding Piaget's two-stage model. This brought him instant recognition in psychology because he broke with earlier approaches to morality. His research challenged the view that adults shaped moral behavior to avoid bad feelings in children. Kohlberg believed children construct their own moral judgments through interaction with others and their own positive emotions to become moral agents.

In 1968, at age 40, Kohlberg assumed a position at Harvard University. He was revered by students and colleagues and spawned a great deal of research, activism, and controversy. In later years, he developed physical illness and mental instability and committed suicide at age 59, walking into the frigid Atlantic Ocean in January 1987, although his body was not recovered until April of that year.

Kohlberg used "moral dilemmas" to study moral reasoning, first studying teens in the United States, and later in Great Britain, Malaysia, Mexico, Taiwan, and Turkey. He found moral reasoning to be gradual and developmental, in stages (like Piaget), with all people going through each level in order, but at different

rates and with rare regression to earlier stages. There are three levels, each with two stages—six stages total (see entry on Moral Reasoning).

Kohlberg's earlier work was questioned because his research had not been cross-culturally validated and there was an issue finding so few individuals at stage 6, the highest level. Kohlberg went on to do cross-cultural research and found the same sequence, but varying end points, based on a given society's levels of social interaction. There were questions about whether a nation's values affect moral reasoning, with group-oriented cultures having somewhat different responses.

Issues also arose about differences between moral thought and moral behavior and whether self-reports, rather than behavioral outcomes, should be assessed (e.g., do our thoughts predict our acts?). Yet Kohlberg found that 15% of individuals reasoning at level III, 55% of those at level II, and 70% of those at level I cheated when given the chance, indicating that moral reasoning and behavior are connected.

Some have questioned the assumptions of "ordinality" and domain specificity. Is moral reasoning the same for a teacher concerning a problem in education as for a lawyer, coming from a different domain? Particular dilemmas also elicited differences in stage, known as *stage mixture,* with the modal response being the stage assigned.

A major concern was gender differences in moral reasoning, questioning the generalizability of Kohlberg's longitudinal work on young males to females (and perhaps to non-Western cultures). Women were found to base moral decisions on caring, personal relations, and attention to human needs, rather than rules, rights, and justice.

Kohlberg's theory of moral reasoning, despite its controversies, has influenced many fields, including education, psychology, theology, law, and even politics, spawning a vast amount of research and a focus on moral issues. His approach to moral education through moral controversies is still very much alive.

—LeoNora M. Cohen and Shelley Dubkin-Lee

See also Moral Reasoning

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KÜBLER-ROSS, ELISABETH (1926–2004)

The first born of triplets in Zurich, Switzerland, on July 8, 1926, Elisabeth Kübler-Ross became a psychiatrist, best known for her pioneering work in the care of dying patients. Her pathway to medicine was not without obstacles. Her father wanted her to join him in his business as a secretary, and when she refused, he insisted her only alternative was to work as a domestic. After working for a family in Germany, she rejoined her family in 1943 and again defied her father by entering an apprenticeship in biomedical research. Elisabeth was restive in the laboratory and found herself drawn to direct interactions with patients. She volunteered as a relief worker in rebuilding the French town of Ecurcey after World War II and later served as a volunteer in the International Volunteers for Peace organization, helping the survivors of the war rebuild their lives and villages. Such experiences convinced her that she could contribute most through a life in medicine and claimed as one of her sources of inspiration the work of Albert Schweitzer.

Kübler-Ross entered medical school at the University of Zurich in 1951 and graduated in 1957. She married an American whom she had met in medical school, Emanuel R. Ross, MD, and together they served as interns at Glen Cove Community Hospital, Long Island, New York. After her internship, she accepted a research fellowship at Manhattan State Hospital, where she went beyond her initial job description to provide compassionate care for her mentally ill patients. Kübler-Ross then entered a psychiatry residency at Montefiore Hospital in 1961. She broke with traditional Freudian practices in the care of patients

and had remarkable success in helping patients through intuitive and innovative practices.

In 1962, she and Emanuel accepted joint positions at the University of Colorado, and Kübler-Ross served as assistant professor of psychiatry at Billings Hospital in Chicago from 1965 to 1970. Although she was hired to teach the psychiatric aspects of patient care to medical students, she was increasingly drawn to share the lessons she had learned in caring for dying patients through seminars and lectures on this topic.

Her research and clinical experiences with dying patients took the form of a book published in 1969, *On Death and Dying*, in which she chronicled her observations that many patients go through five "stages" after being diagnosed with a fatal illness: *denial, anger, bargaining, depression,* and *acceptance.* The book was an immediate success and had a profound affect on the subsequent behavior of health care professionals, many of whom were empowered by Kübler-Ross to emulate her compassionate treatment of the dying.

Kübler-Ross subsequently moved her home to Scottsdale, Arizona. Her health was impaired by a series of strokes in 1995 and 1996 and afterward lived in a group home that provided appropriate care. Kübler-Ross died on August 24, 2004. Just before her death, she was interviewed by National Public Radio and filmed by a crew from Vermont making a film about hospice. Stefan Haupt, a Swiss film maker, recently completed a film on her life that has received popular acclaim in the country of her birth.

—Thomas R. McCormick

See also Death, Dying

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L

Literacy

Literature is my Utopia. Here I am not disenfranchised. No barrier of the senses shuts me out from the sweet, gracious discourses of my book friends. They talk to me without embarrassment or awkwardness.

—Helen Keller

LABOR

Labor is defined as contractions that change the uterine cervix, which results eventually in the delivery of the fetus. Labor is considered one of the most intense experiences of pain widely encountered. The cause of pain might be explained by hypoxia of the contracted uterine muscle (as in myocardial infarction), stretching of the cervix during dilation, or compression of nerves in the cervix.

Labor starts with mild contractions or tightening of the muscles of the uterus. Regular uterine contractions cause softening and effacement of the cervix (i.e., thinning of the cervix) and dilation of the cervix. The degree of cervical effacement is expressed in terms of the length of an unaffected cervix. Before labor, the uterine cervix is about 4 centimeters long and tightly closed. Thus, when the length is reduced by one half, it is defined as 50% effacement, and thinning of the cervix to the thickness of a piece of paper means 100% effacement. The dilation is ascertained by estimating the diameter of the cervical opening. The final stage of dilation, enabling the passage of the baby into the birth canal, is of 10 centimeters opening (i.e., full dilation). Uterine contractions that do not cause cervical dilation are called Braxton-Hicks contractions, which may be observed at any time during pregnancy, but are more common near the end of pregnancy.

Two phases of cervical dilation are the latent phase and the active phase. Latent phase is characterized by contractions leading to cervical softening and the beginning of dilation of the cervix. Active labor means that contractions are regular (three contractions in 10 minutes) and strong, usually beginning at cervical dilation of 3 to 4 cm, resulting in progressive dilation. Much energy is expended during this process, which expresses the term *labor*. A clinical sign of the impending onset of active labor is the discharge of a mucus plug with a few drops of blood that occluded the cervical canal during pregnancy (i.e., "bloody show").

Active labor is divided into three stages. The first stage is defined as regular contractions leading to effacement and progressive dilation of the cervix, ending when the cervix is fully dilated to 10 centimeters. The second stage is the expulsion of the fetus, starting at 10 centimeters. When the cervix is completely open, the patient feels a strong urge to push, which

drives the baby down the birth canal. This stage of labor ends as the baby is born. The third stage, involving several contractions, is the delivery of the placenta and fetal membranes, starting immediately after the delivery of the baby. Disproportion between the contracted uterus and the implantation area of the placenta enables its complete detachment from the uterine wall.

Spontaneous rupture of the membranes, characterized by a sudden gush or trickle of amniotic fluid from the vagina, typically occurs during the active phase of labor. This is a signal that the amniotic membranes have broken. However, rupture of the membranes before the onset of labor is referred to as *premature rupture of membranes*.

Friedman had first described the normal progress of labor in different curves for nulliparous (women at their first delivery) and multiparous women (second delivery and more). According to Friedman, the normal progress during the first stage of labor is cervical dilation rate of about 1.2 cm/hour for nulliparas and 1.5/cm hour for multiparas. The length of the second stage of labor was limited to 2 hours in nulliparous women (or 3 hours if epidural analgesia was applied) and 1 hour in multiparous women (or 2 hours if epidural analgesia was applied). Deviation from these curves has been defined as failure to progress in labor (labor dystocia, or abnormal labor). When time breaches in normal labor limits occur, interventions such as augmentation of labor or even instrumental or operative delivery might be considered.

—Eyal Sheiner

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LANGUAGE ACQUISITION DEVICE

The language acquisition device (LAD) was proposed by Noam Chomsky to explain how children, when exposed to any human language, are able to learn it within only a few years following birth. Chomsky argued that all humans are born with the knowledge of what makes a human language. Included in this innate knowledge must be details of important characteristics of all the world's languages. The term *universal grammar* has been used to describe the knowledge contained in the LAD. The process of language development is envisioned as one in which the child discovers which grammar rules contained within universal grammar apply to the language that the child is learning.

According to Chomsky, humans are born with the LAD, but other species are not. Nonhuman primates and other species do not spontaneously learn human languages. Furthermore, attempts to teach nonhuman species language have yielded mixed results. Chimpanzees and gorillas have learned to use signed languages, such as American Sign Language (ASL). Washoe the chimpanzee and Koko the gorilla have each learned hundreds of signs and can use them to refer to concrete objects and concepts, such as *hungry*. However, neither has been able to master the intricacies involved in construction of grammatically correct sentences.

Chomsky's view of the LAD is consistent with there being specific structures in the brain involved in language learning and language processing. Such brain structures are presumably present in human brains, but absent in nonhuman brains. No specific claim was made regarding the specific location of the LAD in the brain. Although there have been locations in the brain identified as language processing areas, such as Broca's area and Wernicke's area, a location corresponding to the LAD has not been found.

Chomsky's claim that knowledge of language is innate was supported by Eric Lenneberg's *critical period hypothesis.* In 1967, Lenneberg published the book *Biological Foundations of Language,* in which he argued that humans are biologically capable of learning language only until puberty. After puberty, humans are biologically unable to master the intricacies of natural language. For many years, researchers in zoology

had recognized the existence of critical periods of development for a range of nonhuman animal species, such as songbirds, ducklings, horses, dogs, and sheep. Evidence for the Lenneberg's critical period hypothesis for human language was drawn from a variety of sources. Case studies of children raised without sufficient exposure to human language appeared to support the critical period hypothesis. Such individuals, such as Victor, the wild child, and Genie, had not been able to master the grammatical intricacies of sentence construction. Individuals born with severe hearing loss who were not exposed to a signed language until after puberty typically had not been able to achieve native-like proficiency. Furthermore, there was ample anecdotal evidence that individuals who attempt to learn a second language after puberty rarely achieve a level of proficiency comparable to that of one who learns the language during childhood.

Some researchers have rejected the notion that language acquisition is aided by innate knowledge. In 1957, the behaviorist B. F. Skinner published the book *Verbal Behavior,* in which he argued that all types of language behavior were learned after birth through the same learning processes that are used for all human learning. Some contemporary cognitive scientists, such as David Rumelhart and James McClelland, as well as others, view language learning as the result of general learning principles, rather than language-specific mechanisms. According to Chomsky, the primary challenge for this alternative approach to language learning is adequately explaining how children produce word forms and sentences that they do not experience in the environment and, thus, have no opportunity to learn.

—J. Michael Bowers

See also Chomsky, Noam; Language Development

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LANGUAGE DEVELOPMENT

The first words spoken by an infant may seem to mark the beginning of the infant's language development; however, by the time the first word has been spoken at about the age of 12 months, language development has been underway for more than a year. After birth, all normally developing children master the skills necessary for listening and speaking within a few years. Regardless of the language or languages spoken in the home, research has shown that language development proceeds in a remarkably similar fashion.

BEFORE BIRTH

In the 12 weeks before birth, sounds from the world outside of the womb can be heard. By the 24th week of pregnancy, the auditory system of the growing fetus is well developed. Expectant mothers may feel movement by the fetus in response to a loud noise. The startle response can be consistently observed by the 28th week of pregnancy.

The early memories of speech sounds that are formed in the womb represent infants' very first experiences with language. Research conducted with newborns has shown that newborns treat some sounds as familiar while treating other sounds as unfamiliar. Treating a sound as familiar suggests that the newborn gained familiarity with the sound before birth. For example, in research reported in 1980, DeCasper and Fifer showed that soon after birth, newborns prefer to hear the sound of the mother's voice versus the sound of a stranger's voice. Similar research reported in 1988 by Jacques Mehler and colleagues showed that newborns only 4 days old treated sounds from the mother's language as familiar, whereas they treated sounds from another language that was not spoken in the home of the expectant mother as unfamiliar. In 1986, DeCasper and Spence reported one of the most compelling studies of this type. They instructed expectant mothers to read a particular Dr. Seuss book aloud during pregnancy. After birth, newborns showed a preference for hearing the familiar story over a different story that had not been read during pregnancy. A second group of newborns who had not heard either story before birth did not show a listening preference.

LISTENING

At birth, all newborns demonstrate the remarkable ability to distinguish speech sounds occurring in all the world's languages. This phenomenon has been referred to as *categorical perception.* The inborn ability to make fine-grained perceptual distinctions is not unique to humans. Chinchillas, which are small fur-bearing rodents, also demonstrate these perceptual abilities. Of course, chinchillas never acquire human language. An important difference between the perceptual abilities of children and other species is that the perceptual abilities of children change during the first year of life as a result of their listening experiences. By the end of the first year of life, children gradually lose the ability to distinguish speech sounds not occurring in the language or languages spoken in the home.

Young infants' ability to recognize syllables in speech has been shown to be influenced by the frequency with which they are experienced. Research conducted by Peter Jusczyk and colleagues showed that infants as young as 9 months could distinguish single syllables that were frequently experienced from those that were infrequently experienced. In contrast, infants who were 6 months old were unable to distinguish the two types of syllables. Furthermore, research conducted by Eleanor Saffran and colleagues has shown that infants who were 6 months old could distinguish two-syllable sequences, such as *bida* and *kupa,* when presented in a continuous stream of syllables, such as *ibidakupadotigolabubidaku*. In the study, some two-syllable sequences occurred frequently; others occurred infrequently. The results suggested that infants' ability to recognize two-syllable sequences was influenced by the frequency with which the specific syllables occurred in the speech stream played for infants during the study.

Research studies confirm what many new parents may have guessed—children may understand some language even before they have produced their first words. Research conducted by Roberta Golinkoff and Kathy Hirsch-Pasek and colleagues showed that young children who had only one to two words in their productive vocabulary demonstrated the ability to understand certain aspects of meaning contained in spoken sentences. In the study, children were seated in between two television monitors. The children sat comfortably on a caregiver's lap and viewed two videos simultaneously. Both videos depicted the well-known Sesame Street characters Cookie Monster and Big Bird. In one video, Big Bird was carrying out an action and Cookie Monster was being acted upon. For example, Big Bird was feeding Cookie Monster or tickling Cookie Monster. In the other video, the roles were reversed. Cookie Monster was carrying out the action and Big Bird was being acted upon. As children viewed the videos, a spoken sentence was presented to the children, such as "Where is Big Bird feeding Cookie Monster?" The results showed that children preferred to look at the video that matched the meaning of the spoken sentence. This clever study showed that months before children are producing full sentences, they appreciate the fact that the one who performs an action, or the *subject,* is mentioned first in an English sentence, and the one who is affected by the action, or the *object,* is mentioned second.

SPEAKING

Infants' first spoken utterances after birth are most certainly crying. Crying can be viewed as the first important form of communication. In the first 3 months following birth, infants develop distinct cries to indicate hunger, discomfort, or anger. By the third month, children have begun laughing and cooing. When infants coo, they produce elongated vowel sounds, such as *oooh* and *aaaah*. In the months that follow, infants' productions become more and more complex. By the end of the first year of life, infants are generally producing their first words. Table 1 summarizes the different types of vocalizations produced during the first year of life and the ages at which each type of vocalization is generally observed.

By the sixth month, infants begin to practice the sounds of language. This stage of language development has been referred to as the *babbling stage.* Children begin babbling by repeating a single syllable, such as babababa or dududu. This type of babbling is called *canonical babbling.* Later on, children's babbling becomes more complex, as they produce sequences that contain different syllables, such as *bagada* and *dabuga.* This type of babbling is called *variegated babbling.* Of the speech sounds that are produced during these babbling stages, the 12 most common speech sounds found in the world's languages make up 95% of children's babbled productions. Infants will babble speech sounds that do not occur in the language or languages that are spoken in the home. As the infant nears 1 year of age, the infant produces fewer and fewer speech sounds not represented

Table 1 Language Productions in the First Year

Age	*Type of Utterances*
Newborn	Crying
1–3 months	Cooing ("oooh," "aaah")
	Laughing
	Distinct crying to indicate hunger, anger, or discomfort
	Vocalizes in response to speech
4–6 months	Single syllables emerge ("ba," "ga")
6–8 months	Canonical babbling ("bababa," "dadada")
	Attempts to imitate sounds
8–12 months	Variegated babbling ("bagadabu," "dabuga")
	Babbling is produced with sentencelike intonation
12 months	First words, *mama, dada, baba*

in the language or languages of the home. It turns out that as children lose the ability to distinguish speech sounds that are not regularly experienced during listening, they are less and less likely to produce those speech sounds.

Children's first words may be mama or dada or the name of a favorite toy or pet. However, among a child's first words may be invented words. Such words are used consistently by the child to refer to a specific object or action, but are not used by adults. These word inventions are called *idiomorphs.* For example, the child may consistently refer to a favorite food with an invented word, such as *gump.* In the book *Mirror of Language: The Debate on Bilingualism,* Kenji Hakuta describes a child who used the word *Whew!* as a greeting, when others might say *hello.* A possible explanation for the child's choice of greeting was the fact that the child's mother often said *Whew!* when first entering the child's room in the morning, in response to an odor indicating that the child's diaper needed changing. Children's uses of idiomorphs are usually short-lived because they exchange their invented words for the words preferred by adults.

Parents and caregivers may find it relatively easy to decipher the intended meaning of children's production of words; however, there may be notable differences between children's pronunciations and those preferred by adults. Table 2 displays five common phonological errors that children make when producing words. Reductions occur when children omit sounds from the target word. Reductions may occur with reduplication, as when children's productions involve both a loss of sounds from the target word and a repetition of a syllable from the word. Substitutions occur when the infant replaces a phoneme with a different phoneme. Assimilations occur when the infant changes a speech sound in a word so that it is similar to a speech sound appearing later in the word. Coalescence errors occur when a word is shortened, by the loss of intermediate sounds.

The quality of children's productions improves over time; however, some sounds are mastered more quickly than others. For English-speaking children, it may take years to master the articulation of all the speech sounds. English-speaking children between the ages of 4 and 8 years may make errors in the articulation of a number of consonants. The initial consonants in the words *red* and *long* are typically mastered by the age of 5. The initial consonants in the words *church*, *shirt*, *zoo*, *joke*, *van*, and *thumb* are typically mastered by the age of 6. The initial consonant in the word *them* is typically mastered by the age of 7. The most difficult consonant in English is the intermediate consonant in the words *treasure* and *measure;* children typically master it by the age of 8. Although most children eventually achieve adult-like pronunciation on their own, some normally developing children may be referred to speech classes, sometimes called *speech therapy*. In speech therapy sessions, children receive directed instruction and practice for specific speech sounds.

BUILDING A VOCABULARY

The typical adult speaker of American English may know more than 40,000 words. Considering the fact that the child produces the first word at the end of the first year, the task of building an adult-sized vocabulary is a daunting one. In order for children to achieve an adult-sized vocabulary by the age of 18, it is necessary to learn at least six words a day, on average. Parents and researchers have observed that the acquisition of vocabulary by young children does not occur at a steady rate. Between 18 and 24 months, children's vocabularies may double or triple over a short period of time. This phenomenon has been called the *word spurt.* Researchers have discussed the possible explanations for the word spurt. One possibility is that children experience a naming insight, at which point they realize that everything has a name. Children then

Table 2 Children's Phonological Errors

Type of Error	*Examples*
Reduction	"ba" for "bottle"
Reduction with Reduplication	"baba" for "bottle"
Substitution	"tandy" for "candy"
Assimilation	"nance" for "dance"
Coalescence	"paf" for "pacifier"

may set out to learn as many new words as possible. A second possibility is that there are internal changes occurring in children's understanding of words. These internal changes may facilitate the learning of new words. For example, children may come to understand that objects in the world can be grouped into different categories, such as animals, vegetables, fruits, tools, and many others. Children may set out to learn additional members of a category after the category label has been learned.

The earliest strategy used by children to learn words has been called *referential learning.* Children learn words that refer to concrete aspects of the environment. The vocabulary of the 18- to 24-month-old contains far more nouns than other types of words, such as verbs and adjectives. One of the most effective strategies that children can use to learn new words involves asking an adult for help. Children may point to an object and ask, "What's that?" This has been called *the original word game.* The adult provides the answer. The child may then attempt to say the word, and the adult provides a correction, if needed.

Children employ other less obvious strategies when learning new words. When provided with a new word in response to the question—*What's that*?, children as well as adults show a strong tendency to assume that the new word refers to the entire object, rather than to a part of the object or some other aspect of the object, such as color or texture. This strategy has been called the *whole object bias*. The philosopher Quine discussed this bias in his well-known Gavagai Problem. The problem was formulated as a hypothetical case. Imagine you are in a country where you do not speak the language and no one in this country speaks your language. You are walking along with a person native to this country. A rabbit darts across the path, and your companion points toward the rabbit and utters, "Gavagai." What do you assume Gavagai means? Usually, *gavagai* is taken to mean *rabbit,* rather than other comparably plausible meanings, such as *hopping, fur, ears,* or *white.*

Children approach word learning with two additional biases. These are the *taxonomic bias* and *mutual exclusivity assumption.* The taxonomic bias refers to the fact that children generally assume that a new word refers to a type of object, rather than a specific object. For example, the child will assume that the word *dog* refers to a group of animals, not just Toto. The mutual exclusivity assumption refers to the fact that once an object has been associated with a particular label, it will not be assigned a second label. This assumption leads to useful inferences about unknown objects. Consider the case in which a child is shown two objects. Assume that the child has already learned the label of one of the objects and knows it to be a *wrench*. If the child is then told *Hand me the hammer,* the child will infer that *hammer* refers to the object that is not the *wrench* because a wrench cannot be both a *wrench* and a *hammer.*

As any parent can attest, children's usages of newly learned words may not always conform to the usages preferred by adults. A child may use a word, such as cow, to refer to cows as well as other types of animals, such as any four-legged animal. Such errors have been called *overextensions.* Other examples of overextensions include using the word, such as *hot,* to refer to any object that is forbidden or using the word, such as *hat,* to refer to any object placed on the head. When children produce overextensions, they use a word to refer to a set of objects that is larger than the set referred to by adults. In contrast, *underextensions* occur when children use a word to refer to a set of objects that is smaller than the set referred to by adults. For example, a child may use the word *shoes* to refer to a single pair of shoes, such as Mommy's shoes, rather than any and all pairs of shoes. Other examples of underextensions include when children use the word *lights* only to refer to the headlights on a car, rather than all types of light, and when children use the word *milk* to refer only to milk in a glass, rather than milk in any container.

CONSTRUCTING SENTENCES

Children's single-word utterances may be produced with sentence-level intent. The term *holophras*e refers to children's single-word utterances that have meaning

more complex than that of a single word. For example, the utterance *Daddy* may mean a variety of things. *Daddy* may name the presence of the person daddy. *Daddy* may be a request for Daddy to perform some action. *Daddy* may be a reference to a location, if Daddy were holding a desired object. *Daddy* may also refer to some meaning comparable to the meaning of an adult sentence, such as *I want Daddy to come here.*

By 24 months, children are regularly producing two-word utterances, such as *Daddy go* or *eat cookie.* (See Table 3.) These two-word utterances can be viewed as miniature sentences. Roger Brown showed that there are 11 types of semantic relations typically occurring in children's two-word utterances. Approximately 75% of English-speaking children's two-word utterances can be classified in these 11 categories. Research conducted by Dan Slobin has shown that these semantic relations also appear in other languages, including Samoan, Finnish, and Russian.

Table 3 Semantic Relations of Two-Word Utterances

Semantic Relation	***Example***
Nomination	That book
Recurrence	More ball
Nonexistence	All gone ball
Agent and action	Mommy sing
Action and object	Throw ball
Agent and object	Mommy book
Action and locative	Go store
Entity and locative	Book table
Possessor and possession	Daddy chair
Entity and attribute	Big house
Demonstrative and entity	That box

Between 24 and 36 months, children's utterances become more and more similar to the sentences produced by adults. During this time, children are producing longer utterances, on average, such as utterances that contain a subject, a verb, and an object. Furthermore, children begin producing words that contain grammatical word endings or morphemes, such as the suffix *-ed*, which is used to create the past tense form of verbs, as in *walked and talked,* and the suffix *-s*, which is used to create the plural form of nouns, as in *cups* and *dolls*. Classic research conducted by Jean Berko-Gleason showed that children learn to form new words, such as past tense verb forms and plural nouns, by learning rules. Berko-Gleason devised the Wug test to demonstrate children's knowledge of word formation rules. In the task, a child is presented with a picture of an unusual bird-like creature. The child is told, "This is wug." There is an accompanying picture depicting two of the odd creatures. The child is told, "Now, there are two of them. There are two. . . ." Children are asked which word comes next. Children as young as 3 can provide the plural form of *wugs,* a specific word form that they could not have heard before because the word singular word *wug* was a word created for use in the study. Berko-Gleason also tested children's ability to use the English rule for using the past tense suffix *-ed*. Children saw a picture of a man holding a large unusual object in his hands and moving the object from side to side. Children were told, "This man is ricking. Yesterday, he. . . ." Again, children as young as 3 can fill in the past tense form, which they could not have heard before.

The learning of word formation rules may lead children to produce forms of words that adults would not produce. In English, there are some plural nouns and some verbs that are not formed by adding the suffixes *-s* or *-ed*. For example, the plural of the noun *foot* is *feet,* rather than **foots.* The past tense form of the verb *eat* is *ate,* rather than **eated.* When children discover the rule for forming plural nouns from singular nouns or the rule for forming past tense verbs from verb stems, they may sometimes apply the rule inappropriately, as when they say *foots* instead of feet or *eated* instead of *ate*. These errors are called *over-regularization errors.* It is typical for children to produce an over-regularized form of a word that was used correctly before the rule was learned. For example, many young children produce the correct forms of the verbs *go*, *went, gone* in the first 24 months. Later, when the rule for forming past tenses is learned, children may produce errors, such as **goed* or **wented*. After rule learning occurs, children must then determine which words follow the rule (or are regular forms) and which words do not follow the rule (or are irregular forms). Children's productions of over-regularization errors become more and more infrequent in the year following the learning of particular word formation rule.

Children's mastery of complex sentence forms suggests that children master sentence production in a series of stages. Children initially appreciate what a particular type of word means, but then must figure out how to use the word appropriately in a complete sentence. Research conducted by Edward Klima and Ursula Bellugi suggests that children's use of

wh–questions, such as *what did you eat?,* is mastered in a series of stages. The first stage occurs in the first half of the third year of life. During this time, children produce questions with the *wh*– word located at the beginning of the question, but the subject and the verb are ordered as they are in an affirmative sentence, as in *Where I should put it?* In the second stage, children appropriately order the subject and the verb in affirmative questions, as in *Where should I put it?* However, children do not use the appropriate subject-verb order for negative questions, as in *Why you can't sit down?* In the third and final stage, children produce questions with appropriate subject-verb order for negative as well as affirmative questions. Children are typically between 48 and 54 months when they are producing well-formed *wh*– questions.

Edward Klima and Ursula Bellugi's research also suggests that children's production of negative sentences progresses in a series of stages, progressing from an initial stage at which the meaning of a negative word, such as *no,* is learned to a final stage at which children are positioning a negative word or morpheme appropriately within a sentence. Young children's first negative sentences have the form *No eat cookie.* The negative word *no* is placed at the beginning of a sentence. In the second stage, the negative word is produced in the middle of the sentence immediately before the verb, as in *Doggie no bite.* In the third and final stage, the child uses the negative word contracted with the verb in a form that adults use, as in *Doggie doesn't bite*.

HEARING-IMPAIRED CHILDREN

Many children are born each year with some form of hearing impairment. About 1 in 1,000 children is born with a severe hearing loss. In the first months of life, the vocalizations of deaf infants and hearing infants may not be easily distinguished. Deaf infants will cry, coo, and begin to babble. The amount of babbling and the quality of the babbling produced by deaf infants may be reduced when compared with the babbling of hearing infants. Deaf infants are unlikely to produce repeated consonant-vowel syllables characteristic of the canonical babbling stage.

Deaf infants who are exposed to sign language from birth develop sign language skills in a series of stages similar to those observed when hearing infants develop spoken language skills. Signed languages such as American Sign Language (ASL), British Sign Language (BSL), and Chinese Sign Language (CSL) are unique languages, each having their own rules of grammatical structure. Deaf infants exposed to a signed language will spontaneously produce gestures that can best be described as *manual babbling.* They will later produce one-sign utterances and later multisign combinations. Just as with hearing children, as deaf children mature, their multisign combinations become more and more complex in terms of the grammatical properties of the sign sequences. Signing children also make errors in sign production that are similar to the spoken errors made by speaking children. Signing children may produce idiomorph signs, sign overextensions, sign underextensions, and sign over-regularizations. Children's signed sentences also become more and more complex over time. In summary, regardless of language type, the development of language proceeds in a remarkably similar fashion.

NATURE VERSUS NURTURE

An age-old question in the study of human behavior is the classic nature versus nurture debate. How much of children's ability to acquire language is the result of nature, or innate knowledge, and how much is the result of nurture, or general learning influenced by what is occurring in the environment. A number of prominent language researchers have argued that the relative speed and ease with which all normally developing children acquire language is best accounted for by assuming that certain aspects of language knowledge are innate—the child is born "hard-wired" for language. The most notable of these researchers is Noam Chomsky, who argued that all children are born with a *language acquisition device* (LAD) containing knowledge of the essential properties of all human languages. Opponents of this view argue that language learning can be explained as any other type of learning can be explained. Children's exposure to language and experiences with language can account for the language learning that takes place.

Although the nature versus nurture debate in the study of language development is unlikely to be settled in the near future, there is mounting evidence that biology plays an important role. Since the publication of Eric Lenneberg's book *Biological Foundations of Language* in 1967, researchers have recognized the possibility that there may be a critical period for learning language. The critical period for learning language is generally thought to be from birth to puberty. Some researchers, including Steven Pinker, have suggested that the critical window

for language learning is from birth to the age of 5. After the critical period has passed, learning language is more difficult and less successful. Individuals who do not receive adequate exposure either to spoken or signed languages during the critical period may find it impossible to achieve native-like proficiency.

The most compelling evidence for the view that biology plays a key role in certain aspects of language development comes from studies showing the existence of inheritable language disorders. The term *specific language impairment* (SLI) has been used to describe cases in which children show difficulty processing language, whereas they perform normally on tests of general cognition. Research suggests that SLI affects about 3% of the population. Researchers have shown that the incidence of SLI is much higher among family members of an individual identified as having SLI than the incidence in the general population. A family case study reported by Myrna Gopnik and Martha Crago in 1991 showed that of 30 members in an extended family, 16, or 53%, were identified as having SLI. The pattern of inheritance observed in this family suggested that a single dominant gene may be responsible for the disorder.

SUMMARY

All normal developing children who receive adequate exposure to human language will learn language within the first few years of life. By the end of the first year, children are producing their first words and understanding much of the language spoken around them. By the end of the second year, children have amassed a vocabulary of several hundred words. By the end of the third year, children's utterances are becoming more and more similar to the sentences of adults.

—Shelia M. Kennison

See also Babbling; Bilingualism; Chomsky, Noam; Crying; English as a Second Language (ESL); Language Acquisition Device; Mean Length Utterance; Private Speech; Universal Grammar; Whole Language

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LATER ADULTHOOD

The period of later adulthood, defined here as ages 60 through 75 years, is characterized by physical, psychological, and social changes, including both gains and losses. We will examine the multifaceted aspects of successful versus usual versus pathological aging. In examining the changes that occur in later life, researchers often distinguish between primary aging and secondary aging. Usual aging or primary aging refers to gradual, time-related biological processes that are seen as inevitable and universal when comparing young adults to older adults. Some primary physical changes generally associated with later adulthood include a decline in sensory capacity; declines in heart, lung, kidney, and muscle function; and declines in memory. However, within every cohort of older adults, there are those who do not show such declines. These individuals are often considered to be aging "successfully." Pathological aging or secondary aging refers to the changes that occur as a result of particular conditions or illnesses. The changes that occur because of secondary aging tend to be more common in older ages but are caused more by health habits, heredity, and other influences that vary by person. Some secondary aging processes include heart disease, cancer, dementia, and arthritis.

PHYSICAL CHANGES IN LATE ADULTHOOD

Changes in appearance include both primary and secondary aging. For instance, skin becomes dryer, thinner, and less elastic in older age (primary aging);

however, the rate of these changes may depend on sun exposure, lifelong nutrition, and genetics (secondary aging). Dark patches of skin, called *age spots*, become more apparent in the transition to older adulthood.

Sensory changes are also common with aging. As the average person ages, the lens of the eye becomes harder and less flexible, resulting in a decreased ability to view objects that are close to the eye. Many older adults require eyeglasses to correct for these changes. In addition, the lens also becomes yellowed with age, which results in a change in the quality of light that is absorbed. One consequence of this is glare. Older pupils are smaller than young pupils in the same light. Both of these changes affect the eye's ability to adapt to changing light conditions that make night driving more difficult for older adults. There are those eyes, however, that age successfully and never show these types of declines.

Three of the most common diseases of the aging eye are cataracts, glaucoma, and macular degeneration. Cataracts are an extreme condition of lens opacity and are usually correctable with a simple operation to remove the faulty lens and replace it with an artificial lens. Glaucoma involves increasing pressure and atrophy of the optic nerve, which yields abnormalities in the visual field. Macular degeneration involves deterioration of the retina and is a leading cause of blindness in older adults.

Sharp increases in hearing difficulties often start around age 60. About 33% of people older than 70 years report some type of hearing loss. Hearing problems involve the loss of hair cells in the cochlea and disturbances of the inner-ear metabolism. Older adults generally have the most trouble hearing under what are called "masked conditions," when sounds are obscured or rendered inaudible by other sounds.

The probability of disease increases considerably after the age of 60. In the United States, people older than 65 years account for 33% of the nation's health care expenditures while only representing 12% of the population. Common chronic conditions of later adulthood include arthritis, heart problems, and high blood pressure. In people older than 65 years, heart disease accounts for almost 40% of all deaths, whereas cancer accounts for an additional 25%. Neither heart disease nor cancer is an inevitable consequence of aging. Both environmental or lifestyle factors, such as smoking, and genetic factors, such as family history, increase the likelihood that people in later life will develop these diseases. Nevertheless, many of the conditions that are associated with aging can be prevented or remediated with adaptive lifestyles, including good nutrition and exercise.

PSYCHOLOGICAL FUNCTIONING IN LATE ADULTHOOD

Our exploration of the psychological changes that occur with aging will include cognition, mental health, personality, and beliefs. The continued potential for growth and the possibility of decline exists in each of these areas. Cognitive changes in late adulthood are multifaceted. At one end of the spectrum, in later adulthood, we have more experiences and therefore more knowledge with which to face the challenges of daily life. At the other end of the spectrum, we are faced with declines in reasoning, speed of processing, and memory that are often concomitant with the primary physiological changes that occur.

Short-term memory refers to information stored for relatively brief periods of time (<60 seconds). Studies have shown that with usual and successful aging, there is very little decline in late adulthood in short-term memory. However, considerable age-related changes are found on working memory tasks, which involve the active manipulation of different pieces of information in short-term memory. Older adults are more likely than younger and middle-aged adults to experience difficulty holding several items of new information in mind while also trying to analyze and manipulate that information. Long-term memory deficits have also been shown to increase in later adulthood. Older adults seem to have more difficulty on episodic memory tasks such as remembering word lists and text recall. It has, however, been consistently shown that some of these deficits can be remediated by techniques such as training in strategy use and learning.

Dementias are secondary aging processes, which involve a pathological loss of brain functioning in any of the following areas: language, memory, visuospatial skills, emotion or personality, and cognition. Types of dementias include Alzheimer's disease, Parkinson's disease, multi-infarct dementia, and cortical-subcortical atrophies. The incidence of dementias increases with age. The most common form of dementia is Alzheimer's disease, which is characterized by a progressive deterioration of intellect, memory, and personality. Certain abnormalities in the cerebral cortex, called plaques and tangles, are markers for the disease. As

with all of the dementias, Alzheimer's disease is not part of normal aging; however, the incidence of Alzheimer's disease does increase progressively with age. Current findings suggest that about 3% of the population older than 65 years has Alzheimer's disease. Several studies have shown that the occurrence of Alzheimer's disease doubles every 5 years starting at age 65. Multi-infarct dementia is characterized by an irregular, yet progressive, loss of intellectual functioning. The cause of multi-infarct dementia are multiple mini-strokes, in which brief obstructions in the blood vessels of the brain prevent adequate blood flow from reaching different parts of the brain. Finally, subcortical dementias involve the progressive changes to the motor region of the brain, which results initially in losses in motor abilities but eventually often produce cognitive impairment in the late stages. Examples of subcortical dementias include Parkinson's disease, Huntington's disease, and multiple sclerosis.

Another related area of interest in the psychological development in late adulthood is the changes and continuities associated with control beliefs. Control beliefs are a two-part construct encompassing both beliefs about one's abilities to bring about outcomes and beliefs about the role of external factors on outcomes. Older adults tend to believe that age-related declines in memory performance are inevitable, which may in turn influence memory performance. Beliefs about control over one's health also may become more important in later life because of the impact of such beliefs on health care–seeking behavior and treatment adherence.

The research findings on personality across the life span are ambiguous. Some researchers have suggested that personality traits remain stable across the life span, whereas others have suggested that personality traits may vary significantly across the life span. Several variables (age, gender, martial status) have been shown to be important in individual differences in personality change in older adulthood.

Specific psychological problems, such as anxiety and depression, have not been shown to increase in late adulthood. Clinical depression is defined by the presence of several symptoms, including either depressed mood or loss of interest in nearly all activities over a period of at least 2 weeks, significant weight loss or gain, sleep difficulties, fatigue, and psychomotor slowing; whereas mild depression involves fewer symptoms and less impairment. In the past, clinical depression was often thought of as a major problem of advanced age, but there has been little support for this claim. Several studies have shown the rate of depression in adults older than 65 years was significantly lower than for younger adults. Older adults may, however, be at greater risk for mild depression. Some risk factors for late life depression are bereavement, insomnia, chronic health problems, and prior depression. Anxiety disorders, such as panic attacks, phobias, and generalized anxiety disorder, are actually more common than depression in older adults. As with depression, anxiety is often associated with a variety of medical conditions, such as hypertension, dementias, and heart problems. Risk factors for late-life anxiety disorders include sensory problems, spousal bereavement, and high neuroticism.

Changes in sleep patterns are common in later adulthood. Sleep apnea, heartburn, and periodic leg movements are some of the major causes of significant sleep disturbances in old age. In addition, quality of sleep is reduced by many conditions that affect brain function, including heart disease, dementias, and arthritis. As we discussed earlier, these conditions become more frequent with advancing age, thereby increasing the likelihood of impaired sleep in late adulthood, which can in turn affect cognitive functioning.

SOCIAL FACTORS IN LATE ADULTHOOD

There are a variety of social changes that may occur as we enter late life, including change in work status or loss of spouse and other significant others. In most industrialized countries, the age of retirement has been decreasing over the past few decades. Research on retirement has shown that older adults who retire or go to part-time work adjust very well to this change, with some even showing improvement in health and well-being. With retirement come significant changes in time and type of leisure activities, such as continuing education and volunteering. Retirement also brings a shifting of roles within the home and social system.

Many older adults are in long-term marriages. The best predictor of the nature of these relationships in later life is the nature of the relationship in earlier life. This means that although there are often fluctuations, the nature of relationships tends to be fairly stable over time. Because the probability of death increases with age, becoming widowed or losing other loved

ones is an inevitable part of late adulthood. Adjustment to bereavement is therefore often an important part of this time period. Research has shown that social support and emotional stability are important to bereavement recovery. Family and friends typically play an important supportive role in later life. It is not necessarily the number of people in one's social network, but the quality of the relationships that makes a difference. In later life, those who have good social support networks, with low social strain, typically show greater psychological and physical well-being.

SUMMARY

What is successful aging and what is pathological aging are questions that continue to prove a challenge to scientists and lay people around the world. With the population of the world living longer, late adulthood is an important area of research and exploration. In every area of late-life development, there are important improvements, continuities, and declines. Continued research and development will allow us to understand the mechanisms and processes to understand biological, psychological, and social aging. Although we have focused on the period of later life between ages 60 and 75, it is important to note that there is much variability in the timing and extent of gains and losses during this time period. Moreover, the transition to the "old-old" period, which is usually considered to begin between 75 and 80 years of age, is also marked by large interindividual differences in functioning.

—Ann Pearman and Margie E. Lachman

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LEAD POISONING

Lead has been used by mankind for more than 6,000 years because of its resistance to corrosion, its low melting point, and, ironically, sometimes for its sweet taste. Therefore, it is one the most studied environmental toxins, and its toxicity has been known for more than 2,500 years. The major exogenous sources and associated pathways of lead exposure are lead-based paint, the combustion of leaded gasoline, occupational exposure in lead-related industries, lead-contaminated water or food, and industrial and mining activities. Both children and adults are susceptible to health effects from lead exposure, although the typical exposure pathways and effects are somewhat different. Children who live in houses that were built before 1978 and adults who are occupationally exposed are at greatest risk. Lead mining, lead smelting, and use of leaded gasoline are common in many developing countries, where children and adults may receive substantial lead exposure. Effects in children generally occur at lower blood lead levels than in adults (Table 1) because children are more sensitive to lead exposure in a given environment due to their behavior and physiology.

Because of the high hand-to-mouth activity of infants and young children, absorption of lead is estimated to be as much as 5 to 10 times greater in them than in adults. Most human exposure to lead occurs through ingestion or inhalation. Lead exposure in the population occurs primarily through ingestion, although inhalation may be the major contributor for workers in lead-related occupations. Gastrointestinal absorption of lead in children is increased with dietary deficiencies of iron, calcium, zinc, and vitamin C. After it enters the human body, the absorption and biological pathways of lead depend on a variety of factors. Especially important determinants are the

Table 1 Toxic Effects of Lead at Various Concentrations in Children and Adults

Common Toxic Effects of Lead	*Blood Lead Levels (μg Pb/dl blood)*	
	Children	*Adults*
Encephalopathy	85	100
Frank Anemia	75	85
Decreased hemoglobin synthesis	45	55
Increased infertility (men)	—	45
Increased erythrocyte protoporphyrin	18	25
Low IQ	10	—
Decreased hearing and growth	10	—
Hypertension	—	10

physiologic characteristics of the exposed person, including nutritional status, health, and age, along with the type and level of lead exposure.

Lead primarily affects the peripheral and central nervous system, kidneys, red blood cells, and calcium metabolism. It can also cause hypertension, reproductive toxicity, and developmental effects. The blood lead levels associated with encephalopathy in children vary from study to study, but levels of 70 to 80 μg/dl or greater appear to indicate a serious risk. Even without encephalopathy symptoms, these levels can create problems. Although it is often impossible to determine the effects of low blood lead through clinical examination, the developing nervous system of children can be affected adversely with less than 10 μg/dl of lead in the blood. Lead exposure may cause low IQ levels, poor classroom performance, greater absenteeism, reading disabilities, and deficits in vocabulary, fine motor skills, and reaction time. It can also affect hand-eye coordination in young adults more than 10 years after childhood exposure.

Acute, high-level lead exposure has been associated with hemolytic anemia. In chronic lead exposure, lead induces anemia by interfering with heme biosynthesis and by diminishing red blood cell survival. Lead's impairment of heme synthesis can affect other heme-dependent processes in the body outside of the hematopoietic system, including neural, renal, endocrine, and hepatic pathways.

Chelating agents are drugs that bind with heavy metals in the bloodstream, causing them to be discharged from the body in urine and bile. They can be effective at reducing the total body lead burden and acute toxicity effects in individuals with high blood lead levels. However, because of the risk for potentially harmful effects of the chelating agents and the remobilized lead, chelation therapy is generally not recommended for individuals with blood lead levels below 45 μg/dl.

A change in the pro-oxidant-to-antioxidant ratio in favor of the former, because of the production of reactive oxygen species (ROS) by mitochondria, defines *oxidative stress*. The effects of redox active metals on ROS production have been known for years. However, the theory of lead's ability to induce oxidative stress as a redox inactive metal has begun to gain support during the past 10 years. Lead-induced oxidative stress has led scientists to study the protective qualities of antioxidants against lead toxicity, along with their possible chelating abilities. Nevertheless, the use of antioxidants in conjunction with chelating agents as a therapeutic strategy has not been thoroughly investigated.

—Nuran Ercal and Nukhet Aykin-Burns

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LEARNED HELPLESSNESS

Learned helplessness is a behavior pattern involving a maladaptive response characterized by avoidance of challenges, negative affect, and the collapse of problem-solving strategies when obstacles arise. Three components are necessary for learned helplessness to be present: contingency, cognition, and behavior.

Contingency is the idea that there is an identifiable relation between one's actions and the environmental response, such as tapping a drum and the ensuing sound. In learned helplessness research, contingency is more often operationalized as its converse—uncontrollability—so that when an agent acts, there is no identifiable relation with a specific response. Cognitions are also necessary. These are thought of as the way one understands and explains contingency or lack thereof. How individuals explain environmental contingencies leads to the third component of learned helplessness—behavior. Thus, learned helplessness exists in a situation in which there is no observable contingency and in which one expects that this uncontrollability will continue and behaves accordingly, such as by quitting.

ORIGINS OF THE THEORY

This theory emerged in the mid-1960s as Martin Seligman and Steven Maier's attempt to explain why some dogs failed to attempt to escape electric shocks while others easily escaped. Initially, dogs were placed into a harness and strapped down so that they would not be able to escape the shock. At first, they jumped around trying to evade the shock. Eventually, however, these dogs began passively accepting the shock, failing to respond. What was particularly disconcerting to the researchers was that when these dogs were moved into a different box, they continued to passively accept the shock, failing to even attempt escape even though it was now quite easy. Contemporary learning theory was unable to explain this behavior adequately, and learned helplessness theory was born.

As researchers applied the theory to humans, it became clear that human responses are considerably more complex than animal responses. Initial studies were modeled on the animal studies, using aversive events, experimenter-determined controllability or uncontrollability, and examination of subsequent responses. Early results were generally supportive of the theory while continuing to raise new questions.

As attribution theory gained prominence in the 1970s, learned helplessness theory was reformulated to include more specific information about cognitive processes. In particular, Abrahamson, Seligman, and Teasdale incorporated humans' tendency to ask "why" when something happens and noted that their answers can often lead to specific and predictable reactions to events. As the theory now proposed, a person need only expect that an outcome is noncontingent for learned helplessness to result. How the expectation of noncontingency is arrived at is less important, whereas causal attributions of why the outcome is noncontingent become more important in predicting the nature of subsequent deficits. These adjustments in the theory proved more powerful in predicting behavior.

PROCESSES IN LEARNED HELPLESSNESS

Uncontrollability seems to be associated with increases in negative emotions such as anger, anxiety, and depression, reduction in observable aggression, and increased arousal. Self-esteem is particularly susceptible to learned helplessness. Research findings imply that individuals who experience noncontingent outcomes may become increasingly likely to display the helpless pattern. An early question in the human learned helplessness literature was whether or not helplessness actually generalized from one situation to another, as it did in animals. Hiroto and Seligman demonstrated that failure to avoid the aversive event was associated with subsequent failure at a cognitive task, and that failure at a cognitive task was associated with failure to avoid the aversive event, effectively establishing "cross-modal helplessness"—generalization from one type of task to another. This was crucial to the advancement of the theory. Critics had claimed learning was situation specific; Hiroto and Seligman's results effectively countered their arguments.

These findings continue to support the idea of helplessness as a coherent set of deficits, rather than simply a task-specific problem. Individuals who demonstrate helpless patterns make statements suggesting that they believe themselves to be personally responsible for failure, to attribute their failures to stable circumstances, and to state that these characteristics encompass their whole selves. In other words, they seem to believe that they have failed because they are stupid,

they are going to remain stupid, and everything they do is stupid—controllability, cognitions, and behavior. This pattern is often referred to as "explanatory style," and much research has gone into supporting the idea that humans tend to use a particular style to explain both good and bad events.

Critics suggested that perhaps it is adaptive for an individual to stop responding in the face of failure and that failure to solve the problem, not uncontrollability, underlies the helplessness phenomenon. To test this idea, Kofta and Sedek set up an experiment that separated uncontrollability from failure. They demonstrated that, whereas failure resulted in decreased mood, it was the condition of uncontrollability that resulted in task performance deficits. Their data support the idea that participants can distinguish uncontrollability and failure and that passivity as a behavior is a deficit, rather than an appropriate response.

WHO DOES LEARNED HELPLESSNESS AFFECT?

In 1991, Villanova and Peterson conducted a meta-analysis of the literature on learned helplessness in humans. Meta-analysis is a statistical procedure that combines data from many different studies. Findings suggest not only that humans tend to reliably demonstrate deficits in subsequent performance after failures, but also that the magnitude of this tendency is relatively robust. Furthermore, these findings appear to be consistent across age, gender, and type of task. Evidence of generality is surprising, considering that many researchers believed that certain types of people (e.g., women) may be more susceptible to helplessness than others.

Carol Dweck and colleagues have studied the presence of helplessness deficits in children, finding evidence that children as young as 4 and 5 are susceptible. They demonstrate many of the same characteristics as older children and adults. In a related study, O'Donnell found that 41% of 4- to 6-year-old children who failed on three unsolvable puzzles showed the helpless pattern when later presented with solvable puzzles, lending further support to Dweck's findings. Children exhibiting this pattern have difficulty acquiring and demonstrating cognitive skills in the face of adversity. They demonstrate dramatically poorer outcomes in a wide variety of domains, including social relationships, sports, moral development, and academics. It is apparent that a child's orientation toward challenging tasks has a compelling impact on the child's future adjustment in a variety of areas.

There is very little evidence at this point describing the antecedents of learned helplessness. Some research suggests a genetic component, noting that monozygotic (identical) twins are more alike in their explanatory style than dizygotic (fraternal) twins. This is thought to be due to their higher level of genetic similarity but could also be explained by their greater degree of shared experiences. Others have looked for correlations between parental explanatory style and children's, finding only slight relations. One promising area is looking at parental provision of structure and intrusiveness. Results suggest that paternal intrusiveness disrupts environmental contingency and may result in adoption of a helpless pattern in early childhood. Clearly, more work needs to be done in this area.

APPLICATION OF THE THEORY

The primary application of learned helplessness has been to depression and other emotional disorders. Susan Nolen-Hoeksema and colleagues have studied the precursors of depression. They discovered that explanatory style (i.e., cognitions) is a more powerful predictor of depression than negative life events. Pessimism and a general tendency to explain events as internal and stable are correlated with depression. However, it may be that the reverse is true; individuals with a learned helplessness pattern may be more likely to see problems when another person in a similar circumstance sees opportunities.

Much of the empirical work on perceived control has been conducted in academic environments. To understand the relation of control to helplessness, researchers have examined the interaction of the teacher's behavior in the classroom (social context) and children's perceptions of what they have to do to succeed (strategy) and whether they have the capability to do what it takes (confidence). Results indicate that strategy and confidence combine to produce the child's actions (engagement in the classroom) and subsequent outcomes.

We have also learned through several different studies that learned helplessness can be unlearned. Just as dogs in a box can be taught to escape, schoolchildren who are told that they will probably get better at a task also tend to improve. Dweck in particular found that teaching children to attribute failure to lack of effort rather than lack of ability was helpful in

changing subsequent performance. Other researchers have made similar contributions to understanding the retraining process. Peterson has gone so far as to refer to retraining as an immunization against depression, making a comparison to Salk's polio vaccine.

Further research on learned helplessness will consider better ways of conducting research, understanding the relations between explanatory style and behavior, learning how parents contribute, and, perhaps most important, learning how to prevent it.

—Susan L. O'Donnell

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LEARNING

Learning is a relatively permanent change in behavior due to experience. As the individual interacts with the environment, certain events promote behavior. In some cases, the outcomes produced by those responses inform the individual about likely consequences for behavior in future situations. Behaviors include a wide array of events, from basic physical processes to complex higher-order cognitive functions. Thus, behavior is anything the individual does. Given sufficient information about the experience of the individual, predictions can be made about likely behaviors in future settings.

The contribution of biology is unique for each individual and lays the foundation for characteristic interactions with the environment. The particular repertoires of behavior, reflexes, and species-specific patterns of responding that are inherited within a group or organisms are referred to as learned, though at the level of *phylogeny*. In contrast, learning that occurs within the lifetime of a given organism is called *ontogenetic*.

In these interactions, learning can be affected by two general processes. Learning, or conditioning, that occurs in the lifetime of the individual can be produced through association of events or through the arrangement of consequences. Respondent conditioning is the process by which responses are elicited by stimuli that come to control behavior through their relationship with other known events. In contrast, operant conditioning is the process by which the likelihood of behavior is changed by the consequences that follow it in particular settings.

Learning can be the product of naturally occurring environmental relations or through intentionally arranged contingencies. When learning occurs through the use of programmed contingencies, an effort should be made to transfer stimulus control to naturally occurring contingencies to promote generalization and maintenance.

RESPONDENT CONDITIONING

Respondent conditioning has also been known by other names. Frequently, it is referred to as *Pavlovian conditioning* because of Ivan Pavlov's famous research with the learned salivation of dogs. Additionally, it came to be described as *classical conditioning* to distinguish it from operant conditioning in both entry into the scientific vocabulary of psychology and in how behavior is produced. Both terms, classical and Pavlovian, however, neglect the importance of the automatic nature of responses in the presence of certain stimulus events.

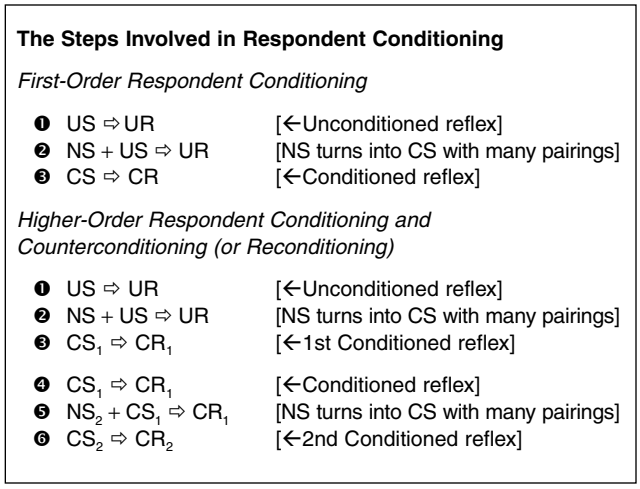

Figure 1 The Respondent Conditioning Model

Referring to Figure 1, you will see the three-step process involved in respondent conditioning. First, an unconditioned stimulus elicits an unconditioned response. Innate patterns of responding to particular events that occur involuntarily are referred to as *reflexes*. Responses that are present at birth, such as reflexes, are described as unconditioned. Unconditioned responses are behaviors that occur because of the action of unconditioned stimuli. Stimuli are described as persons, objects, or events in the environment that affect behavior. In respondent conditioning, stimuli are said to elicit responding because of automatic or innate behavioral patterns. Elicitation is the process whereby a stimulus has the power to cause a response. Think of the image of a rock flying toward the windshield of your car. You are aware that the windshield will protect you from the rock, but as it hits, you startle and blink anyway. In this case, we would say that the rock elicited, or brought forth, your startle response. It caused you to blink, you did not choose it voluntarily. In fact, you may have had difficulty preventing or minimizing the response because of its automatic or unconditioned nature.

The power that the stimulus has to cause a response in respondent conditioning is great; thus, we say that the stimulus has strong control over responding. Other stimuli may have differing degrees of control. The concept of stimulus control simply refers to how likely a given stimulus is to cause a particular response. Stimulus control is also a factor in how long a given unit of learning is maintained and how readily it is generalized.

The second step of respondent conditioning involves the pairing of a neutral stimulus and the unconditioned stimulus to elicit the unconditioned response. In addition to reflexes present at birth, new stimulus events that have no previous significance to the individual can also come to control, or elicit, previously known responses through the pairing of these new, or neutral, stimuli with unconditioned, or known, stimuli. Such pairing typically requires many practice trials. However, one trial learning can occur if the association between the neutral stimulus and the unconditioned stimulus is sufficiently strong. The frequency of pairing, saliency of the stimuli, timing of the stimulus presentation, and intensity of stimuli effect how quickly stimulus control will transfer from the unconditioned stimulus to the neutral stimulus to form the conditioned stimulus. It is also important to note that the order of stimulus presentation affects the learner's ability to form associations. Presenting the unconditioned stimulus before the neutral stimulus is called *backward conditioning*, and it is rarely effective at transferring stimulus control from the unconditioned stimulus to the neutral stimulus. Instead, short delays between the presentation of the neutral stimulus and the unconditioned stimulus, or overlapping presentations produce the strongest associations between the two stimuli. It is this association that allows stimulus control to transfer from the unconditioned stimulus to the neutral stimulus.

After a transfer of stimulus control from the unconditioned stimulus to the neutral stimulus has occurred, the neutral stimulus is renamed the *conditioned stimulus* because it will now have the power to elicit the response independently. In the final phase of the conditioning event, we also rename the response, calling it now the *conditioned response* to indicate that it is elicited by the conditioned stimulus. Note that even though seven terms are present in the respondent conditioning event, there are really only two stimuli (one known and one novel) and a single response. The different names for terms at each step indicate the source of control over behavior.

The initial associations established through relationships with reflexes are called *first-order conditioning*. There are many stimuli that elicit responses automatically. For example, think of how you react to a loud noise in a quiet room or a warm cup of soup on a cold day. Stimuli that impact our senses directly are best considered in first-order conditioning events, such as sights, sounds, smells, physical sensations, and tastes. Others may pose that certain social stimuli as smiles or hugs can be included here as well. More

complex patterns of responding can also be established through the association of conditioned stimuli with additional neutral stimuli, producing further conditioned responses. This process is referred to as *higher-order*, or *second-order, conditioning* because both stimuli are conditioned. Through higher-order conditioning, treatments such as systematic desensitization can establish new respondent associations to reverse the effects of such reflexive responding as that seen in phobias.

To determine whether a stimulus is unconditioned or conditioned, one can consider how an adult and a young infant may respond to it. If they respond the same, as in the case of a loud sound in a quiet room, then it is unconditioned. If their responses are different, as would be the case in presenting a $100 bill to the adult and the infant, then the different response must be the product of ontogenetic learning occurring during the lifetime of the individual, and thus the stimulus is conditioned.

Although the respondent conditioning model may seem complex, it is highly useful in establishing strong and consistent responses to certain events. Stimuli can be conditioned to a variety of responses and even emotional reactions. In fact, kindergarten teachers often use this procedure to establish the classroom as a pleasurable and desired environment by filling it with stimuli most children enjoy, thus creating an association between school and fun and increasing the child's inclination to attend.

Once behavior is learned through respondent conditioning, it can be maintained, reconditioned, reduced through extinction, or generalized. Behavior may also come under the control of operant conditioning contingencies.

OPERANT CONDITIONING

In operant conditioning, behaviors are said to operate on and to be changed by the environment. Specifically, particular stimuli are present in a given setting and come to occasion responding, which in turn produces certain stimulus effects. The stimuli present before behavior are referred to as *antecedents*. Antecedent stimuli function to set the occasion for, or evoke, behaviors in that they signal appropriate times for the individual to emit each behavior. Antecedents gain strength in their ability to evoke responding through their reliable occurrence in the presence of certain consequences. Consequences are stimuli that are produced as a result of behavior and affect the probability that the behavior, and similar responses, will occur again in similar settings. It is a misconception to think of consequences as something to be avoided; rather, they are defined by their ability to influence the occurrence of a particular behavior again in the future. Some consequences increase the likelihood of a response, and some diminish this probability. Either way, consequences are neither good nor bad; they merely help us to make predictions about what we are likely to do and why behavior persists.

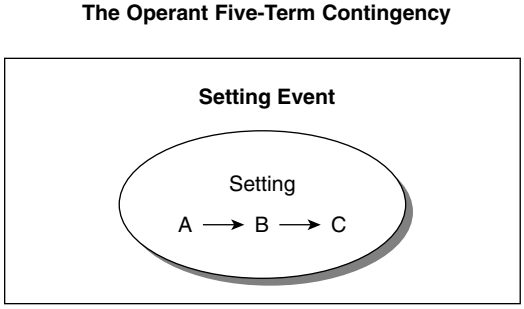

Figure 2 The Operant Conditioning Model

Operant conditioning is described by a five-term model. As seen in Figure 2, the most basic portion of this model is the A-B-C analysis. Antecedents evoke behaviors, which then produce consequences. The evocative function of antecedent stimuli is distinct from the eliciting function of stimuli in the respondent conditioning model. Although both evocation and elicitation rely on stimulus control, the control stimuli exerted in operant conditioning are dispersed across the antecedent stimulus, the setting, the motivation of the learner, the control exerted by competing stimuli, and other factors. Antecedents are said to set the occasion for responding. In this conceptualization, stimuli might be thought of as signals, predictors, or influencing factors, but not causal events.

This A-B-C event occurs in the context of a particular setting and is further influenced by setting events present before the individual enters the setting. Setting events include elements that function to motivate the individual because of states of satiation and deprivation, sometimes called *establishing*, or *motivating, operations*.

The operant conditioning model includes four principles of learning: reinforcement, extinction, punishment, and stimulus control. Stimulus control was discussed previously. Thus, the remaining principles will be examined in more detail.

Reinforcement

Reinforcement is the process by which consequences are applied to increase the future probability of a given response. Reinforcement, like all principles of learning, is defined functionally, that is, by the effect that the consequence has on behavior. If a stimulus is presented or removed following the occurrence of a particular behavior, and that behavior occurs again in a similar setting in the future, we would say that reinforcement was in effect. When a pleasant stimulus is presented and behavior reoccurs, then we would say that positive reinforcement has been provided. In the context of this definition, the term *positive* refers to the presentation of a stimulus immediately following a response and should not be confused with the common use of the word positive to refer to something as good or encouraging. Conversely, when an aversive stimulus is removed following the emission of a behavior and that behavior becomes more likely to occur again in the future, the process is called negative reinforcement. The term *negative* in this context refers to the removal of a stimulus following a response and should not be confused with the common use of the word negative to refer to something as unpleasant or harmful. In both cases, whether the behavior is changed by the presentation or removal of a stimulus, behavior must always have an increased probability of occurrence following the consequence to be defined as reinforcement. Quite simply, behavior must continue to happen or happen more often after a stimulus follows behavior for reinforcement to have taken place.

When one is attempting to establish a new behavior, it is important to provide a reinforcer following each occurrence of the target behavior. This is called *continuous reinforcement*, and it facilitates the acquisition of new repertoires by providing a consistent set of consequences for behavior. Once behavior has been established, the schedule of reinforcement can be thinned such that every other behavior, for example, can be reinforced and still maintain a consistent performance on the part of the learner. This thinning of the delivery of reinforcement has the advantage of more reliably approximating the reinforcement delivered in everyday settings. This will facilitate the transition of the learner from a programmed teaching environment to a more natural setting.

An intermittent schedule of reinforcement can be changed in two ways: in a fixed or variable manner. Fixed schedules of reinforcement have a preset amount of behavior that must occur before reinforcement is delivered. In contrast, variable schedules work around an average amount of behavior. Behavior can be measured along the dimensions of ratio, duration, or interval. A ratio schedule requires that a fixed or variable number of responses occur before a reinforcer is delivered. Duration schedules measure the amount of time that a behavior occurs. Interval schedules measure the amount of time between the first behavior and the repetition of that same behavior. Thus, one might use an intermittent schedule of reinforcement to maintain a known behavior on a fixed or variable ratio, duration, or interval schedule.

In common nomenclature, the terms reinforcement and reward are used synonymously. This use is incorrect in that it fails to distinguish the characteristic effect on behavior that reinforcement has. Consider the example of a reward for a lost kitten. This may function as an antecedent for some, but not others, to search for the kitten. A bully might steal the kitten from me and claim the reward; the reward will not change the bully's searching behavior (although bullying might be reinforced). The behavior of searching may "pay off" if you are the first to bring the correct pet to its owner. Additionally, one must consider that not all stimuli are equally reinforcing to all learners all of the time. If searching happens more often after receiving a monetary reward, then reinforcement of searching behavior has occurred.

Extinction

Once a behavior is conditioned through the use of reinforcing consequences, it can be maintained, changed, diminished through extinction, or generalized. Maintenance is when a behavior persists over time, even after the contingencies that established it are no longer present. A behavior that was once reinforced, such as thumb-sucking in a young child, can later be punished. This change in consequences will change the likelihood of that behavior reoccurring. An operant behavior may be extinguished by withholding or changing the consequence that established it. Withholding reinforcement for a previously reinforced response is referred to as *operant extinction*.

A common outcome of extinction is an extinction "burst," or an increase in the previously reinforced response immediately after an extinction procedure has been introduced. Extinction bursts are common because the individual is conditioned to receive a certain

reinforcer following a specific response, and when that reinforcer does not follow the response, the individual repeatedly emits the response as in the past to produce the reinforcer. Over time, the rate of the response decreases to zero in the absence of reinforcement. Occasionally, after a period in which the behavior is not observed, it may reemerge. *Spontaneous recovery* occurs when the individual emits the extinguished response after a period of time has passed from the extinction procedure. If the response still produces no reinforcement, it again is extinguished. A final possible outcome for an established response is that it may generalize to occur in new settings. There are two types of generalization: stimulus generalization and response generalization. In the case of stimulus generalization, a class of functionally similar stimuli can come to evoke a known response. Response generalization occurs when a class of functionally similar responses comes to be evoked by a single known stimulus.

Punishment

Punishment, like the other principles of learning, is defined functionally by its effect on behavior. Punishment is a process that produces a decrease in the probability of that behavior occurring in again the future. Punishment is often mistakenly thought of as something painful, cruel, or at least unpleasant. Although it is true that aversive control is exercised in punishment, that is, stimulus conditions that the learner does not prefer are arranged, the use of punishment should be governed by the highest standards of ethics, and it should always be used as an intervention of last resort.

Punishment can operate in two ways. First, positive punishment is defined as the presentation of a stimulus immediately after a response, which decreases the probability of that response occurring in the future. Some examples of positive punishment include overcorrection, positive practice, and physical restraint. Overcorrection is a punishment procedure that calls for the individual to restore the environment to a more improved state than it was in when the behavior occurred. Positive practice procedures involve requiring the individual to correctly complete a task repeatedly, following an instance of incorrectly performing the task. For example, the individual throws trash in the sink as opposed to the garbage. To reduce the probability of performing the incorrect form of the behavior, a positive practice procedure would involve requiring the individual to repeatedly throw trash in the garbage. Physical restraint procedures are also considered to be positive punishment in that a physical restraint is presented after the behavior to reduce that behavior in future settings.

The removal of a stimulus immediately after a response, which decreases the probability of that response occurring in the future, is the second type of punishment: negative punishment. Time-out and response cost procedures are examples of negative punishment. Time-out procedures involve removing the individual from a reinforcing situation following the target response, or not allowing reinforcement for a specified amount of time following the target response. Response cost is a procedure usually associated with a token economy. A response cost procedure entails removing tokens, or similar items already earned, as a result of an occurrence of the target behavior.

Regardless of the type of punishment used, it must always have the effect of decreasing the probability of that response, and similar responses, in the future. In light of this definition, it is interesting to consider the prison system. Most would consider it a punishment system. However, it can only be punishment if the probability of the criminal behavior that produced the incarceration is decreased. For the many inmates who commit the same crime again following release, prison might be more appropriately defined as a reinforcement system, or one that has no consequential effect on behavior for that learner.

There are many considerations to make before implementing a punishment procedure. Punishment procedures can produce a wide array of side effects. These side effects include negatively reinforcing the behavior of the punisher, aggression, an increase in escape-motivated and avoidance-motivated behaviors, modeling of future punishment behaviors, and ethical conflicts.

Ethics of Punishment

There are many ethical issues associated with the use of punishment procedures in clinical settings. An important rule to remember is that professionals should always be seeking the most effective and efficient strategies to promote the success of the learner that are the least restrictive for the client. Punishment procedures are intrusive by nature, and the client's fundamental human rights must be carefully considered.

A thorough review of prior intervention plans and reasons for their failure should also be considered when considering the adoption of a punishment procedure. A punishment procedure should have a clear rationale. Informed consent should be obtained before starting any punishment procedure. Meeting with the client or the parent or guardian of the client and reviewing the history of the client and prior methods that have failed to produce a lasting behavior change is part of the process of obtaining informed consent. The proposed punishment procedure should be carefully explained, including possible side effects of the procedure. All of the members of the team should have ample opportunity for questions and suggestions and to experience the punishment procedure themselves. If the individual or parent or guardian demonstrates an understanding of the procedure and provides written consent, the procedure may be put in place under the supervision of a qualified professional. As with any learning program, the learner's level of behavior before, during, and after the intervention should be carefully measured and constantly evaluated.

MODELING AND IMITATION

In addition to biological inheritance and respondent and operant conditioning, learning can also occur through the process of modeling and imitation. In social settings where learners are present who have acquired a particular skill, they may demonstrate that behavior in the presence of other learners. Behaviors are more likely to be modeled if there is similarity between the learner and the model, if the consequences of behavior for the model are favorable to the learner, and if the learner has a history of reinforcement for the imitation of the behavior of others. Once a learner performs a behavior, it can be shaped by the environment. Thus, it may be strengthened through reinforcement, weakened through punishment, or changed in other ways by the action of the environment.

Imitation of the behavior of a model may occur immediately, or after a time delay. Models can be present directly to the learner or can appear through other media, including video, books, games, or even verbal descriptions. In some applications of modeling for teaching new skills, the learner may even serve as an appropriate model for later imitation through the use of video recording. Self-modeling has been used in many settings to establish many behaviors.

PRINCIPLES AND THEORIES

Important distinctions can be made among principles of learning, theories of learning, and learning theorists themselves. The scientific study of how individuals learn has revealed the fundamental principles of learning that govern the behavior of all living organisms. These principles include reinforcement, punishment, extinction, stimulus control, and respondent conditioning.

The study of human behavior has demonstrated that certain patterns of responding can be observed in individuals with similar characteristics when placed in similar types of settings. These consistencies have given rise to a variety of theoretical analyses of learning. Unlike principles of learning, theories of learning may not have universal applicability. However, they may have useful and broad explanatory appeal and often shape social and political policy.

TEACHING AND LEARNING

The science of learning is a rich source of information for the design of effective and efficient teaching and learning environments. Learning can be facilitated through the application of sound teaching practices. All learners can benefit from the application of maximally effective practices; although in the case of learners with special needs, the power of remedial and accelerated learning programs is dramatically enhanced by the adoption of teaching and learning practices with demonstrated effectiveness.

Creating learning environments that maximize motivation without being distracting is important. Learners' unique repertoires of strengths and learning opportunities should be assessed. Individualized curricula, goals, and monitoring programs are appropriate for students of all types. Many classrooms will employ peer groups, learning stations, and carefully selected lessons matched to each student's repertoire to facilitate simultaneous instruction of learners at the appropriate level.

—Deirdre Lee Fitzgerald and Amber Derick Walker

See also Classical Conditioning, Cooperative Learning, Habituation

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LEARNING DISABILITIES

Learning disability is a general term that describes specific kinds of learning problems. It is thought to be a neurological or processing disorder that affects the brain's ability to receive, process, store, and respond to information. It can cause a person to have difficulty learning and using certain skills despite having at least average intelligence. The skills most often affected are reading, writing, listening, speaking, reasoning, and doing math.

The legal definition of learning disability comes from the Individuals with Disabilities Education Act (IDEA). This is a federal law that guides how schools provide special education and related services to children with disabilities. IDEA defines a specific learning disability as "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia." However, learning disabilities do not include learning problems that are mainly the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. Many states use a discrepancy formula to define learning disability. That is, the student shows a gap, often of 2 years or more, between his or her IQ score and achievement level in a particular area.

HOW COMMON ARE LEARNING DISABILITIES?

As many as one in five people in the United States has a learning disability. About 5% of the total population of all school-age children receive special education or related services because of a learning disability. The percentage of children classified as learning disabled has increased substantially—from less than 30% of all children receiving special education services in 1997–1998 to a little more than 50% today.

About three times as many boys as girls are classified as learning disabled. The gender difference has been given several explanations, such as greater biological vulnerability for boys and because boys are more likely to be referred as a result of their disruptive, hyperactive behavior. Social class is associated with learning disability because the risk for exposure to harmful toxins, such as lead and tobacco, at early stages of development is greater in low-income communities.

The most common learning disability is reading disability, especially phonological skills, which involve understanding how sounds and letters match up to make words. Dyslexia is a severe impairment in the ability to read and spell.

One of the most talked about learning disabilities is attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHD). About one third of people with a learning disability also have ADHD. It is characterized by extreme hyperactivity and distractibility, which makes it difficult for them to concentrate, stay focused, or manage their attention to specific tasks. Treatment has typically been in the form of either mild stimulants such as Ritalin or behavior modification techniques.

CONSEQUENCES OF LEARNING DISABILITIES

Learning disabilities affect every person differently. Most learning disabilities are lifelong. Compared to people without a learning disability, those with a learning disability are more likely to show poor academic performance, high dropout rates, and poor employment.

Children with a learning disability who are taught in the regular classroom without extensive support rarely achieve the level of competence of even children who are low achieving and do not have a disability. However, with appropriate help, people with learning disabilities can and do learn successfully. They can be high achievers and can be taught ways to get around the learning disability. Despite the difficulties they encounter, many children with learning disabilities grow up to lead normal lives and carry on productive work.

CAUSES OF LEARNING DISABILITY

Experts are not exactly sure what causes learning disabilities. A leading theory is that learning disabilities stem from subtle disturbances in brain structures and functions, which in many cases begin before birth. Heredity may be a factor because learning disabilities

tend to run in families. Learning disabilities may be caused by drug or alcohol use during pregnancy, illness or injury during pregnancy or labor, low birth weight, lack of oxygen, and premature or prolonged labor. After birth, the occurrence of head injuries, nutritional deprivation, and exposure to toxic substances such as lead are associated with learning disabilities. Learning disabilities are not caused by economic disadvantage, environmental factors, or cultural differences. In many cases, there is no apparent cause for the learning disability.

IDENTIFICATION

There is no one sign or set of clues that a person has a learning disability. Experts look for a noticeable difference between how well a child does in school and how well the child could do, given his or her intelligence and ability. Some signs of learning disabilities are listed here. Most of them relate to elementary school tasks because learning disabilities tend to be identified in elementary school. If a child shows a number of these problems, the possibility that a learning disability is present should be considered. When a child has a learning disability, he or she may have difficulty learning the alphabet or rhyming words, have difficulty with spelling, struggle to express ideas in writing, have messy handwriting or hold a pencil awkwardly, learn language late and have a small vocabulary, not know where to begin a task or how to proceed, or not be able to retell a story in order. These are only a few of the potential signs of a learning disability.

If there is reason to believe a person has a learning disability, it is important to collect observations by parents, teachers, doctors, and others regularly in contact with that person. If there does seem to be a pattern of difficulty that is more than just an isolated case of trouble, the next step is to seek help from school or consult a learning specialist for an evaluation.

It is better to identify learning disabilities early so that appropriate educational opportunities can be provided. Observe the way the child develops language, motor coordination, and social skills and behaviors important for success in school. Not all children who are slow to develop skills have a learning disability. There are very large individual differences in development.

INTERVENTION STRATEGIES

There is no single intervention or treatment for learning disability. In general, effective interventions that use a combined model of strategy instruction and direct instruction in the skill area are most effective. Recommended instructional strategies include small interactive groups, peer tutoring or mentoring, technology such as computer training programs, augmentation of teacher instruction using homework or other extra practice, directed questioning, and strategy cueing.

Reading disability has received the most research attention. The most common core deficit for those with reading disability is a deficit in phonological processing skills, especially phonological awareness, which is associated with difficulty learning to decode and recognize words. Individuals typically have difficulty translating a written word into units of sound. In other words, most cases of reading disability are associated with a deficit in verbal language skills, not in visual skills. It is a common misperception that dyslexic people reverse letters. Interventions designed to improve phonological awareness and letter knowledge skills have proven to be moderately effective. This is especially true if the intervention is begun early, is intensive, and is carried out by trained personnel.

LEARNING DISABILITY AND THE CLASSROOM

Depending on the type and severity of the learning disability, as well as the person's age, different kinds of assistance can be provided. In 1975, the U.S. Congress passed Public Law 94-142, the Education for all Handicapped Children Act, which mandated for the first time that all U.S. children, regardless of handicap, were entitled to a free and appropriate education in the least restrictive environment possible. Under the Individuals with Disabilities Act (IDEA) of 1997, which renamed the 1975 law, and the Americans with Disabilities Act (ADA) of 1990, people of all ages with learning disability are protected against discrimination and have a right to different forms of assistance in the classroom and workplace. These protections are not designed to provide an advantage for the person with the learning disability but instead to provide them with the assistance they need to learn in an appropriate environment. This assistance is prescribed by law and is to be provided at public expense.

Mainstreaming, the educational practice of including special education students in regular classrooms for parts of the school day, and full inclusion, placing the special education student in the regular classroom for the full day, have become more common. This has

been partially in response to calls to reduce the stigma of being labeled as learning disabled, to expose the learning disabled child to the real world, and to provide the learning disabled child access to more advanced curricular content. The research on the effects of mainstreaming are inconclusive, based on a small number of studies, and focused more on children with mild learning disabilities than with moderate and severe disabilities. The general conclusion at this time is that there is a small to moderate beneficial effect of inclusive education on the academic and social outcomes of special-needs children. However, this effect should be evaluated in terms of the type and severity of the learning disability, the quality of training provided to the teacher, and the level and kinds of support available in the school system.

SUMMARY

Learning disability is a complex topic. It is very common, but there remains much debate about how to identify and serve the needs of those with a learning disability.

—Stephen Burgess

See also Dyslexia

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LESBIANS

A lesbian is a woman or girl who is sexually or romantically attracted to females, or who engages in same-sex behavior or relationships. The word *lesbian* was coined in the 17th century based on the Greek island of Lesbos, where the female poet Sappho wrote erotic poetry about love between women in the 7th century BC. In the late 18th and early to mid-19th century, lesbianism was considered sexually deviant by notable psychiatrists such as Sigmund Freud (1856–1939) and Helene Deutsch (1884–1982), who viewed lesbians as manly or having penis envy. Even today, it is difficult to estimate the prevalence of lesbianism due to continuing negative stigma. Although some lesbians are "out" or openly identified as lesbian, many more are "closeted," hiding their sexual orientation.

The 20th century broke new ground for lesbians because of the emerging urban subcultures such as Harlem in New York City and Berlin, Germany, where bars and parties created an early gay and lesbian community in the 1920s and 1930s. The late 1960s and 1970s were especially significant for U.S. lesbians (and gay men). First, in 1969, the Stonewall Inn Bar in New York City's Greenwich Village became a site of activism that changed the gay and lesbian community forever. Police raided the bar, and for the first time in the United States, gays and lesbians fought back against discriminatory harassment. The modern Lesbian, Gay, and Bisexual Movement arose from this protest.

Additionally, in the 1960s and 1970s, the second wave of the U.S. Women's Liberation Movement helped to further develop individual lesbian identity, connecting political affiliation and sexual choice together under Lesbian Feminism. Classifying oneself as a woman-identified-woman or a lesbian separatist became a political statement against, among other things, economic dependence on men.

In the 1980s and 1990s, third-wave feminists increasingly used the term *queer* to refer to all sexual minorities, including lesbians. There was also increasing awareness of the diversity of the sexual minority experience, including race, ethnicity, socioeconomic class, and cultural and national differences. A new development was the concept of *gender* as continuous, changing, and socially constructed rather than as binary, static, and biologically determined. Changing notions of gender identity influenced definitions of sexual orientation—someone who used to identify as a heterosexual man might now identify as a woman (still attracted to women, as before), thus as a lesbian.

Changing concepts of gender also influenced the meaning of masculinity and femininity. Before second-wave feminism, lesbians imitated the gender

roles of heterosexual couples; a lesbian was either *butch* (acting, dressing, and identifying as masculine) or *femme* (correspondingly feminine). During the women's movement of the 1970s, wearing androgynous, comfortable clothing, having short hair, and using no makeup were standard appearance for lesbians. Now there is a reemergence of butch and femme roles among lesbians, although with more fluidity and flexibility than before. Thus, lesbians of different age cohorts may have different norms about appropriate and desirable ways to look like a lesbian.

Resulting from the explosion of gay activism in the United States during the 1960s and early 1970s, the psychiatric field began to reevaluate its classification of homosexuality. In 1973, the American Psychiatric Association removed homosexuality as a mental illness from the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*. Social science research on lesbianism changed from a focus on pathology to an emphasis on the lesbian experience. Recent research has included the coming-out process, lesbian parenting, lesbians in couples, and issues facing lesbian youth, among others. There is still little research (and much controversy) about the origins of sexual orientation and developmental stages in the coming-out process.

—Patricia R. Cardozo, Anna Letitia Marsden, Rebecca S. Klinger, and Esther D. Rothblum

See also Gay Marriages, Homosexuality

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LESCH-NYHAN SYNDROME

Lesch-Nyhan syndrome is an X-linked recessive inborn error of purine metabolism caused by absence of, or deficiency in, hypoxanthine-guanine phosphoribosyl transferase (HPRT). HPRT metabolizes hypoxanthine and guanine to uric acid. First described in two brothers by Lesch and Nyhan in 1964, the disorder is fortunately rare, occurring in less than 1 in 200,000 births. It affects almost only males and is apparently equally distributed geographically and among ethnic groups. The disease is either inherited or arises through genetic mutation. The expression of the gene is fully recessive, making the disorder virtually exclusive to males by transmission from their mothers. Females can be carriers, but rarely exhibit the disease. A few reported cases in females are believed to have occurred through genetic mutation.

DIAGNOSIS

Owing to its similarities to other brain disorders such as cerebral palsy, Lesch-Nyhan should be diagnosed through appropriate laboratory tests. These include HPRT-activity testing in tissue samples, prenatal enzyme assay, and DNA analysis through amniocentesis or chorionic villus sampling.

CHARACTERISTICS

The disorder is characterized by numerous neurological-behavioral motor abnormalities, the most horrific being severe and chronic self-injurious and aggressive behaviors. Self-injurious behaviors (SIBs) are so persistent and potentially damaging that physical restraint is generally required. The most frequent SIBs are hand biting and lip chewing, which often lead to considerable tissue loss. Because pain perception is normal, affected children may scream while emitting SIBs and beg to be physically restrained. Lip chewing can be so self-mutilating that teeth extraction is necessary, even in infancy. Other motor dysfunctions include choreoathetosis (slow, wormlike large muscle movements), spasticity, hypertonicity, and articulation and

chewing-swallowing problems. Although mental retardation has been seen as a regular feature of Lesch-Nyhan syndrome, the motoric dysfunctions make interpretation of standard intelligence test scores difficult. Some affected boys have shown normal memory skills, range of emotions, concentration abilities, self-awareness, and social skills, suggesting that the degree of general cognitive deficiency may often be overestimated. Sensory functioning appears to be normal. Morales presents a detailed description of characteristics of Lesch-Nyhan individuals.

The extreme overproduction of uric acid results in gout, hyperuricemia, and other manifestations of renal dysfunction.

DEVELOPMENTAL COURSE

Lesch-Nyhan individuals appear normal at birth. The earliest sign of the disorder occurs at about 10 to 30 days of age when high levels of uric acid, indicative of renal dysfunction, lead to orange crystalline deposits in diapers. Affected infants show normal motor development usually until 3 to 6 months of age, when they begin to show marked hypotonicity, delays in motor development, and loss of previously acquired motor skills. At about 6 to 12 months of age, hypotonicity is replaced by hypertonicity: arching of the back, poor head control, choreoathetosis, spasticity, and other involuntary motor movements. Affected individuals are generally unable to sit or stand without assistance. Speech is greatly delayed and limited.

Self-mutilation begins at about 2 years of age and may lead to differential diagnosis from cerebral palsy. Self-injurious and aggressive behaviors become more severe and destructive with age. The earlier the onset of SIBs, the worse they become over time. Motor dysfunction is also progressive, with greatest deterioration occurring in later childhood; hip dislocation and leg scissoring may result in serious injury unless the individual is closely monitored.

TREATMENT

Allopurinol effectively reduces HPRT-based hyperuricemia and its various renal effects, including gout, but does not reduce neurologic abnormalities. Serotonin reuptake inhibitors, used to correct dopamine and serotonin levels, have shown short-term improvements, but over time, effectiveness significantly diminishes. Benzodiazepines may be prescribed for behavior control, although they do not have long-term effects on self-injury.

Treatment of motor dysfunctions has limited effect. The best preventative strategy for self-injurious and aggressive behavior has been stress reduction and protective restraint. Behavior modification successfully reduces such behaviors in some cases, as described by Olson and Houlihan, but no commonly effective treatment is available. Differential reinforcement of other (DRO) behaviors and differential reinforcement of incompatible (DRI) behaviors are perhaps most effective and relatively unlikely to have iatrogenic effects. Extinction, although sometimes effective, is both slow and risks danger of bursts of SIBs owing to frustration. Punishment with electric shock actually increased SIBs in one case, whereas punishment with spraying vinegar solutions in combination with reinforcement for other behaviors reduced SIBs in another. Particularly with explicit programming, generalization across settings and long-term effects may occur.

Research suggests that self-mutilation is based on reduced dopamine-neuron function and norepinephrine turnover. Recent development of HPRT-deficient animal models, as well as research with affected humans, may lead to understanding of the biochemical basis of self-mutilation and more effective treatment.

—Robert T. Brown and Katherine D. Falwell

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LITERACY

The acquisition of reading and writing skills—especially reading—always an important element in American education, has received growing attention in recent years, as exemplified by the No Child Left

Behind (NCLB) Act enacted by Congress in 2001 and signed by President Bush in 2002. The legislation begins with a concentration on reading and mathematics achievement, with attention to other content areas added over a period of time. The goal for reading is that by 2014 every child in the United States will be a proficient reader at grade level, as documented by rigorous, standardized, criterion-referenced, statewide tests. All children will demonstrate competency by the end of third grade. NCLB is designed to support programs to help children build language and pre-reading skills before they start kindergarten, and it mandates that all reading instruction should follow scientifically based research.

An elaborate system has been set up to document progress. In the case of reading, each state is required to test all children annually in grades 4 through 8 and once in high school. Annual goals are established on a statewide basis for the percentage of children projected to demonstrate proficiency. Goals are set for school enrollment in general and for categories including gender, race/ethnic status, income level, and disability. States, school districts, and individual schools are expected to make adequate yearly progress toward the stated goals, with consequences for those not demonstrating progress. Present achievement gaps that now exist by gender, race, income, and disability will be erased by the year 2014.

The stated goals are laudable and ambitious. It would be helpful to contrast them with the extant data on reading achievement on American children. This is difficult because there is no one consistent set of instruments for the assessment of reading in children across the country. There are some international assessments, but these typically are norm referenced, are given to small samples, and are of questionable validity. The best resource presently available is the National Assessment of Educational Progress (NAEP), also known as *the Nation's Report Card*. NAEP has been in existence since 1969 and tests samples of children from public and private schools in each state at grades 4, 8, and 12 in 11 different subjects, including reading and writing. State-level results were reported for approximately 350,000 children for reading in 2003 and for writing in 2002.

The data present a picture of the challenge presented by the goals of no child left behind. In 2003, less than one third of fourth graders tested across the nation were rated proficient or above in reading, 33% of females and 26% of males. By race, 39% of white children, 12% of black children, and 14% of Hispanic children were rated proficient. In only one state, Connecticut, did more than 40% of children achieve proficiency. The eighth grade results were quite similar, with comparable gaps by gender and racial category, except that in no state did 40% of children achieve proficiency.

The results for the writing assessment were similar. Only 27% of the national sample of fourth graders were rated proficient, but the gender gap was more pronounced, 35% of females and 18% of males. By race, 32% of white children, 14% of black children, and 17% of Hispanic children achieved competency. In only two states, Connecticut and Massachusetts, did more than 40% achieve proficiency. As in the reading assessment, the eighth grade results were similar, with comparable differences by gender and racial status.

Clearly, there is a gap between the real and the ideal. The goal of 100% proficiency by 2014 seems unrealistic given the evidence that in 2002 and 2003, fewer than 30% of American fourth and eighth graders were rated as proficient readers and writers, with males, minority children, and children in several states falling far below the averages. Ultimately, success will be measured by how close we come to the ideal goal, not its actual attainment.

On the surface, the acquisition of reading and writing skills should be relatively simple. It has been likened to training the eye and hand to do the work of the ear and tongue. Because children typically have already mastered the basic structure and functions of spoken language before they are exposed to formal literacy instruction, it would seem that it would be relatively easy to match speech to print, a process of phoneme (sound) to grapheme (print) correspondence. Once the connections are made, the child should be literate. Of course, the situation is not quite so simple. Large numbers of children never learn to read and write competently. The NAEP and thousands of research reports document this. Although spoken languages and print languages are quite complex and involve processing on several different levels, there are also some fundamental differences. The most obvious difference is that children learn a spoken language naturally, without direct instruction. They are active learners who, to a large degree, have mastered phonological, morphological, syntactic, semantic, and pragmatic aspects of a language in a relatively short period of time without conscious effort. They are active learners and do not have to be directly taught.

In fact, if a child does not demonstrate linguistic competency well before the beginning of schooling, this, in itself, is reason for concern.

The phoneme-grapheme correspondence between speech and print is inexact, and the 43 or 44 phonemes of American English, depending on dialect, are represented by only 26 letters. Even there, the representation often is not logical, with readers aware of almost endless inconsistencies in the spelling of spoken words. To compensate for this and other inadequacies in the print code on English, we resort to devices such as upper- and lowercase letters, commas, periods, hyphens, sentences, and paragraphs. The apparent simplicity of a print system hides significant complexities.

Over the years, the inability to develop satisfactory levels of literacy in the population as a whole has led to ongoing conflict that at times has been referred to as the *reading wars* or the *great debate*. Although there has been tremendous diversity within each camp, three distinct approaches may be identified. One approach has been characterized as a top-down model, also referred to as using *whole language,* or *look-and-say, instruction*. In this, the emphasis is on content and the child constructing meaning from print. The child begins with inferences and expectations and proceeds through text to verify or modify predictions and generate new ones. Relatively little emphasis is giving to spelling, sounding out of words, or other word-attack skills. The same philosophy is applied to writing. Young children are encouraged to express themselves, and their ideas are given precedence over technical concerns such as spelling, punctuation, and subject-verb agreement. It is assumed these skills will develop over time.

In opposition to the top-down model is the bottom-up model, which may be characterized as utilizing a building-block, elemental, word-attack strategy. Children are encouraged to sound out words, and there is an emphasis on what has been labeled "phonics." Meaning is in the text, not in the child. The goal of instruction is to provide the child the skills to "break the code" and to establish the relationship between sound and print. To a large degree, a bottom-up approach involves drill and practice and rote learning. Writing instruction emphasizes spelling, punctuation, grammar, and vocabulary development.

A third, or interactive, model holds that reading and, by extension, writing are a complex interactive process that simultaneously involves bottom-up (text-based) and top-down (cognitively based) processes that interact with and complement each other. The implication is that either a top-down or bottom-up model is insufficient for the development of true literacy and that an interactive, parallel processing model is preferable.

Research in relative effectiveness of the different model, from our perspective, has been mixed. In American education, the traditional approach to literacy followed a bottom-up paradigm, albeit under different labels. This began to change as early as the 1920s, with the introduction of look-and-say readers and a shift to holistic instruction. Conflict over the perceived success or failure of top-down models flared over the last third of the 20th century, with concerns that "Johnny can't read." In recent years, the pendulum has swung back toward a bottom-up approach, and a concentration on "phonics." In fact, the No Child Left Behind legislation that calls for instruction to be scientifically based and research based states that instruction in literacy should be grounded on instruction utilizing phonics. It has been widely reported that, regardless of prevailing trends, teachers, with pragmatic concerns of teaching real children, tend to utilize elements of both top-down and bottom-up models, hopefully approaching the idea of an interactive system.

—Margery Miller and Donald Moores

See also Reading, School

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LOCKE, JOHN (1632–1704)

Born in Somerset, England, John Locke was a noted philosopher and academician, political adviser, and physician. Educated as a child at the Westminster School, Locke endured an educational regimen that stressed strict adherence to rules, severe punishments, and rote memorization. Undoubtedly, Locke's dissatisfaction with his education at Westminster was responsible, to a significant extent, for both his stalwart support of home schooling and private tutors and his forceful criticism of institutional education.

Much of Locke's views on education and human development—set forth in a series of letters to a cousin and later published as *Some Thoughts on Education*—reflected his philosophical writings on the nature of knowledge and human understanding (although scholars differ on the precise relationship between these two bodies of work). In *An Essay Concerning Human Understanding*, Locke argued that the human at birth is a *tabula rasa* (blank slate), entirely devoid of any ideas or other mental content. All the content of the human mind is derived from the data of sense experience, which is then transformed into increasingly complex ideas through reflection and reason. Crucial to Locke's philosophical view, and of great significance for his thoughts on education, was his emphasis on the role of experience in the acquisition of knowledge. In the first paragraphs of *Some Thoughts on Human Education*, Locke contended that the depth and breadth of one's knowledge are overwhelmingly a product of education and experience, as opposed to natural intellect. Locke recognized that children were born with different aptitudes that, for the most part, could not be significantly altered. Furthermore, Locke believed that children possessed a natural disposition for reason. In this regard, Locke's view on childhood challenged the prevailing attitude of his day, according to which children were to be viewed suspiciously because they were inherently prone to vicious behavior. According to Locke, children should be thought of and treated as rational beings, with an inherent disposition for virtuous behavior. And children are best able to develop their intellectual and social skills, according to Locke, through various kinds of play and the practicing of certain skills, rather than through rote memorization of assorted rules.

Locke's writings on education influenced successive work in education theory long after his death. By the end of the 19th century, *Some Thoughts on Education* had been through numerous English editions, as well as several editions in French, German, and Italian.

—Richard M. Buck

See also Tabula Rasa

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LOCUS OF CONTROL

Locus of control (LOC) is a term used to refer to individual perceptions regarding personal control, particularly with regard to control over important outcomes. For example, have you ever tried to convince someone to vote, emphasizing the impact his or her vote could have in an election? Have you ever known someone who did not apply for a job promotion, deciding instead that his or her hard work did not matter as much as "who you know"? These examples illustrate how our motivation for performing a particular task may be influenced by how much we feel our actions influence certain outcomes or, conversely, the extent to which we feel end results will be due to forces outside of our control.

WHAT IS LOCUS OF CONTROL?

Julian Rotter first proposed the concept of LOC in 1966 while attempting to develop a more accurate model of social learning theory (SLT), a theoretical model that predicts the likelihood that a person will exhibit a particular behavior. Much of the work calculating human behavior up until that point adhered to a strict behavioral model. That is, it examined the execution of behavior as being contingent primarily on how rewarding the end result would be for an individual. Rotter was one of the first to incorporate a cognitive component to this model, stating that behavior is not simply contingent on the value of the reinforcer, or end goal. Rotter theorized that the extent to which a person believed that his or her behavior could affect the outcome of an event would also contribute to whether the behavior was executed. SLT has since been expanded on, but this expectancy component is still considered to be an important factor in predicting behavior. It is this expectancy belief regarding an outcome that is referred to as LOC.

A person's LOC can be either internal or external. Internal LOC is the belief that a person's actions or involvement in a given situation can directly affect the attainment of a particular reinforcer. For example, if Tom thinks that studying will better prepare a person for an exam, and that this preparedness will increase the likelihood of getting an "A," then Tom likely possesses an *internal* LOC and will probably study diligently for his exam. Conversely, external LOC is the belief that the attainment of a goal has little to do with one's involvement or actions, but is instead due to outside forces such as luck, chance, or the control of powerful others. Relating this to the previous example, Ty may believe that a person cannot predict the exam's content, thereby leaving his or her performance up to chance. Ty would be less likely to study for the exam because he presumes that individuals' actions have little influence over the outcome of the test.

As LOC theories gained popularity, many other theories were proposed examining constructs incorporated into a person's perceived control of a situation. One of those components, self-efficacy, is often confused with LOC, and for that reason, a distinction should be made. LOC is a person's belief regarding the degree to which external events are a product of individual effort or of forces outside of individual control, in general. Self-efficacy, on the other hand, is a person's perceptions of his or her own specific ability to perform the behavior necessary to achieve a particular outcome. It is more orientated toward a person's opinion of his or her own personal competencies in pursuing a goal.

PROBLEMS DEFINING LOCUS OF CONTROL

When the concept of LOC was first introduced, a wealth of literature was published exploring the concept. One of the major criticisms of many of these earlier studies was that it examined the concept in isolation, neglecting other facets of Rotter's SLT. The exclusion of other components (such as the value of the reinforcer to the individual) was misleading because it examined LOC out of context and affected its capacity to predict behavior. Most of the current literature attempts to place LOC within an SLT framework. For instance, when assessing the extent to which Lisa will attempt to quit smoking, we examine more than simply the degree to which Lisa believes quitting smoking will improve her health (LOC). We must also take into account how much Lisa appreciates her health (reinforcer value) and how capable she sees herself of being able to quit (self-efficacy).

A second criticism of early research is that it frequently mislabeled LOC as a trait characteristic (i.e., a personality characteristic that is fixed throughout the life span). Although this issue is still debated, the majority consensus is that LOC evolves as a person

develops and encounters new experiences. Additionally, research also suggests that LOC can change depending on specific situations. Although it is possible to assess a person's general LOC beliefs, a more accurate account measures their beliefs as they relate to the situation being examined. For instance, a measure of a person's political LOC would be more predictive of their voting behavior than their general LOC. Thus, unlike some early perceptions of LOC as a fixed and invariant construct, more recent conceptualizations suggest that LOC is responsive to an individual's experiences, circumstances, and level of development.

A third criticism of the LOC literature is that an internal LOC is frequently misperceived as being intrinsically beneficial. This stems from the increased motivation often associated with an internal LOC. Although an internal LOC is sometimes beneficial, this is not always the case. People who view themselves as the operative force in attaining a desired result may also place unnecessary blame on themselves when they do not achieve their goal. They may think they have more power to influence a situation than they actually do. This inflated sense of effectiveness may also affect the person's adaptability, including the person's ability to take direction or work as part of a team.

ASSESSMENT OF LOCUS OF CONTROL

LOC is measured using self-report assessments typically created for specific age groups. These assessments are available for populations spanning from preschool age to the elderly, as well as for people of various races and ethnicities. In general, LOC assessments do not simply identify someone as internal or external, but place individuals on a continuum spanning the two. Along this continuum, people may be identified as being "more internal" or "more external." Some common LOC measures include the *Internal-External Locus of Control Scale*, the *Adult Nowicki-Strickland Internal-External Control Scale*, the *Nowicki-Strickland Internal-External Control Scale for Children*, *Crandall's Intellectual Achievement Responsibility Scale*, and the *Multidimensional Health Locus of Control Scale*. Validity for LOC scales typically relies on the scale's ability to predict behavior, the degree to which a measure correlates with other established LOC measures, and the extent to which it discriminates between conceptually different LOCs.

Consistent with modern conceptualizations, LOC assessments can be structured towards a person's general LOC beliefs or LOC beliefs with regard to a specific situation, event, or condition. Some of the more popular situation-specific LOC scales target areas such as health, school, and work and have helped predict variables such as adherence to medical regimens, academic achievement, and vocational success. In general, these specific LOC measures have demonstrated superior predictive validity when compared with the more general LOC measures. The knowledge gained from LOC scales can help guide interventions striving toward helping people achieve maximum benefit in their respective circumstances.

LOCUS OF CONTROL AND DEVELOPMENT

Developmental trends in LOC are best examined using general LOC measures (as opposed to situation-specific measures). This is because many of the situation-specific measures target experiences that occur only within certain developmental stages. When examining age trends among more general measures, it is important to consider the role of a person's cognitive development in how that person views his or her environment. Historical and cultural contexts are also important to take into account because societal values may influence a person's perception of control.

LOC beliefs have been shown to change across development, in that children's LOC beliefs tend to become more internal with increasing age. However, this is not a strictly linear trend. Research has shown a large increase in internal LOC at about sixth grade and a small decrease just before high school. This overall increase in internal LOC across childhood makes sense within the context of development: as children become more independent and self-sufficient (i.e., less reliant on parents), they tend to view their actions as being more instrumental in the attainment of goals. These internal LOC beliefs have been shown to stabilize in adulthood. Research has suggested that LOC beliefs later become more external as a person enters old age. This may be related to an increased dependence on others for personal needs such as health and finance.

SUMMARY

LOC refers to a person's beliefs regarding how instrumental individual effort is in achieving a desired

result. A person who believes goal attainment is dependent on his or her personal efforts in a given situation is said to have a more internal LOC. On the other hand, a person who believes outcomes are the result of outside forces, such as luck or powerful others, is said to have a more external LOC. In general, LOC becomes more internal as a person develops through childhood and adolescence, remains consistent during adulthood, and becomes more external as one progresses through old age. Although general LOC measures are available, the most accurate predictor of a person's behavior in a particular circumstance is a LOC measure specific to that situation.

—Eric Benson and Ric G. Steele

See also Bandura, Albert; Cognitive Style; Theories of Development

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LONELINESS

In everyday language, loneliness describes feeling disconnected from important others by virtue of physical separation or emotional conflict. In psychology, loneliness is defined as having an inadequate or less satisfying network of friends and family than is desired. Loneliness and aloneness are distinct; solitude is enjoyed when one wants to be alone, whereas loneliness can be experienced in a crowd.

Loneliness is highly unpleasant, but quite common—one large survey estimated that 25% of the adult U.S. population experience loneliness during any 2-week period. Although loneliness typically is transitory, its importance mostly derives from its potential to become chronic, thereby changing the interpersonal perceptions and behavior of the lonely person in ways that tend to perpetuate loneliness (e.g., by inhibiting the restoration of old relationships and the development of new ones). For example, research shows that high lonely as compared with low lonely participants are less skillful and more rejecting when given the opportunity to interact with strangers. Similarly, although virtually all forms of therapy appear to be effective in reducing loneliness, there is evidence that the lonelier the person, the less likely that he or she will seek professional help. Also, whereas mild feelings of loneliness are associated with interpersonal overtures toward others, chronic and severe loneliness appears to elicit coping strategies that exacerbate rather than address the problem (e.g., withdrawal, use of alcohol and drugs).

Loneliness can be easily and reliably measured with brief self-report instruments. The UCLA Loneliness Scale is the most widely used and thoroughly validated case in point. Although most scales yield a global index of loneliness, there is utility in distinguishing between the loneliness of inadequate friends and companions (social loneliness) and loneliness associated with the absence of an intimate partner (emotional loneliness).

With respect to developmental continuity and change, an important issue is the age at which loneliness first appears. Early writers on the topic argued that loneliness did not emerge before preadolescence, whereas recent research suggests that it may occur much earlier. Attachment processes have been implicated in the development of loneliness. For example, the quality of the parent-child relationship predicts childhood and adolescent loneliness. There also is evidence that loneliness is transmitted across generations.

The developmental processes involved in the development of loneliness appear to be stable across the life span. For example, at all ages, the same dispositional variables (e.g., self-esteem, social anxiety)

and psychological processes (e.g., internal and stable attributions for social failure) are related to and predictive of loneliness. Similarly, regardless of age, qualitative measures of relationships (e.g., satisfaction) are better predictors of loneliness than quantitative measures (e.g., number of friends). On the other hand, specific interpersonal deficits appear to be different but age appropriate among various age cohorts. Lonely adolescents tend to lack friends, whereas lonely young adults are more frequently without romantic partners, for example.

People who appear to be most vulnerable to the experience are young, unattached, and socially unskilled (e.g., shy), often experiencing disruptions in their interpersonal networks by virtue of geographical mobility (e.g., going away to college) or changes in interpersonal status (e.g., divorce). Indeed, it is generally held that loneliness usually originates from the combination of personal vulnerabilities and disruptions of relationships. Although women appear more vulnerable than men in some studies, this is likely a measurement rather than a gender difference.

Loneliness is related to assessments of adjustment and mental health, which is not surprising given the negative thoughts and emotions involved. However, there is also evidence that loneliness is associated with basic physiological processes (e.g., production of white blood cells) in such a way as to increase the lonely person's susceptibility to illness.

—Warren H. Jones

See also Older Adulthood

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LONGITUDINAL RESEARCH

Longitudinal research refers to research that investigates events or phenomena over an extended period of time. Longitudinal research studies can be as brief as 1 or 2 years, for example, when evaluating the effects of a particular learning strategy, technique, or treatment. They can also run over several decades, as when examining changes in adult personality and health behaviors. They allow changes to be assessed over a variety of levels and take into account the natural development and growth that occurs across the life span. For example, consider a study that follows children over a several-year period to assess the consequences of media exposure, as opposed to a study done over a few months to evaluate the effects of exposure to violent images on levels of overt aggression. The first would be longitudinal, whereas the second study would not be considered a longitudinal study unless the children or age cohort was repeatedly assessed over a longer period of time.

TYPES OF LONGITUDINAL STUDIES

There are four principle types of longitudinal studies: trend studies, cohort studies, panel studies, and case-based studies. All four types tend to be descriptive, in that they generally do not manipulate *variables* (a variable is any clearly described item or construct that can be observed and analyzed), but describe how selected variables change over time and how these changes are related to other variables. Trend, cohort, and panel studies typically use instrumental measures, such as surveys, questionnaires, pencil-and-paper tests, and other standardized instruments, supplemented by descriptive measures. Case-based studies typically use descriptive measures, such as interviews, projective techniques, observations, and narratives and are supplemented by instrumental measures.

Trend studies examine changes within a defined sample population that does not stay constant. For example, if you are interested in changes in the amount of television or video exposure in preschool-age children, you could take a survey sample from preschool-age children repeatedly, over several years, and look at the trend. The children from whom you draw the sample would be constantly changing, and you would be measuring the patterns of change in the

viewing exposure of a defined sample population, 3- to 5-year-old children, over time.

Cohort studies examine changes within a defined sample population that is stable. For example, if you are interested in changes in employment and health status of American Vietnam-era combat veterans, you could periodically sample from a directory of U.S. military personnel who were listed as serving in combat between 1962 and 1974. The sample may contain different individuals at each data collection point, but it would represent the same population cohort at each time.

Panel studies examine changes over time within a selected sample that remains constant. For example, you are interested in describing the changes that occur over time as people age. You could select a group of people and have them complete a variety of measures at repeated intervals over several decades. The people in the study remain the same at each data collection point, with natural attrition (e.g., an individual's death) being the primary cause of the panel sample changing.

Case-based studies examine changes within organizations, groups, or individuals, often with regard to some intervention. The intervention could be training, a new policy or procedure, an educational program, or therapy. For example, you are interested in changes in an organization resulting from the introduction of a training program for a new technology. You could collect a set of measures from a sample of employees or students before the introduction of the program and then repeat the measures at set intervals. Similar to a cohort or panel study, a case-based sample would remain stable (in the case of employee or student samples in an organization) or the same (in the case of group or individual participants).

ADVANTAGES OF LONGITUDINAL STUDIES

Longitudinal research is an effective and powerful method for investigating developmental variables and is essential in understanding outcomes for most naturally occurring or socially imposed interventions. One of the chief advantages of longitudinal research is that, since the same subjects or cohorts are being followed and repeatedly sampled over time, changes that are observed can be attributed to individual changes, rather than variations over individuals (referred to as *sample variance* or *statistical error*). This allows a reliable description of patterns of change in individuals or groups, and a description of the direction and magnitude of causal relationships between variables, that would be available no other way.

DISADVANTAGES OF LONGITUDINAL STUDIES

Longitudinal studies are considered nonexperimental, meaning that they are not conducted using randomized selection of participants who are compared with a matched control group through manipulation of a variable to expose the effect of that variable on the (experimental) participants. Nonexperimental studies are considered inferior by experimentalists, who place primary importance on the causal inference that randomization, control, and manipulation theoretically provide. However, as mentioned earlier, longitudinal studies can be used to describe the direction and magnitude of casual relationships, even though they are not as theoretically precise as experimental studies in determining causal relationships.

From a more practical perspective, the central disadvantage to longitudinal research is the length of time it takes to complete a study, with the attendant problems of attrition (in both participants and research assistants), costs, and measures. Conducting a research project that follows a group of participants over the course of years or decades requires significant investment of time from both the participants and the research team, significant financial support to maintain contact with participants and involvement of investigators, and significant foresight on the part of the investigators in selecting measures that will not become antiquated during the course of the study.

EXAMPLES OF LONGITUDINAL STUDIES

The Study of Adult Development at Harvard has followed two panels of people over a long period of time: a panel of 268 Harvard students selected from the sophomore classes between 1939 and 1942 representing a socially advantaged, predominately male group and a panel of 456 disadvantaged inner-city males from Boston born about 1930. This Harvard-based study has focused on the physical and psychological health of the panel members, using social histories, biennial questionnaires, face-to-face interviews (every 15 years), and complete physical examinations

(every 5 years). It has provided numerous insights into the components of healthy aging as well as insights into social and cultural constraints on aging, adaptation to stress, habits and coping skills, and childhood risk factors.

The Seattle Longitudinal Study, a study of adult development from midlife through old age, has followed a panel of people since 1956. The research has focused on psychological development during the adult years. The original panel of 500 participants was randomly selected from a community health program and ranged in age from early twenties to late sixties. The study has continued since 1956, with data collected in 1963, 1970, 1977, 1984, 1991, and 1998. At each interval, a new group of people randomly selected from the same community health program have been asked to participate. As of the 1998 data collection, nearly 6,000 people have participated at some time in this study. Of the original participants from 1956, 38 people remain who have now been in the study for 42 years. The study collected data from the primary participants as well as siblings and offspring over the years, and it has been the source of numerous academic publications, as well as congressional presentations and policy discussions regarding issues related to aging, retirement, and other public policy considerations.

Numerous other databases have been created over the past several decades. Many agencies and institutions make these databases available to qualified researchers at no cost or for a nominal fee.

SUMMARY

Longitudinal research studies investigate events or phenomena over extended periods of time. They follow the same or a similar group of people and are essential in understanding human change and development. However, they demand significant investments of time and resources and are usually descriptive because they do not provide the precise cause-and-effect logic of experimental studies. They provide reliable descriptions of patterns of change and of direction and magnitude of change that would be available no other way.

—Daniel Coffman

See also Baltimore Longitudinal Study of Aging, Berkeley/Oakland Longitudinal Research, Cohort, Cross-Sectional Research, New York Longitudinal Study (NYLS), Seattle Longitudinal Study

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LONG-TERM MEMORY

Long-term memory encompasses all learning or knowledge that is stored in the mind for longer than a few seconds or minutes. It encompasses all forms of learning and memory: memory for past events, facts, motor skills, perceptual skills, and conditioning.

Long-term memory interacts with short-term memory (also called *working memory*). Short-term memory consists of information currently being held in mind—the current contents of consciousness. The interactions between short-term memory and long-term memory are described in the Modal model of memory. In this model, perceptual information from the world is first stored in sensory system-specific buffers; in vision, this is referred to as *iconic memory*, and in audition, *echoic memory*. Some information can then pass from sensory memory into short-term memory; the amount of information is limited by attentional resources and the size of the short-term memory store. Once in short-term memory, information can be rehearsed; some information in short-term memory is transferred to long-term memory, generally information that receives more attention or is processed more deeply.

If information is not transferred to long-term memory, it cannot be retrieved later. A good illustration of the interactions among sensory, short-term, and long-term

memory is in the common situation of looking up and calling a telephone number. When the telephone number is viewed in the phone book, it enters sensory memory, along with all the other information on the page. However, only the attended phone number moves from sensory to short-term memory. Once in short-term memory, the number can be rehearsed over a period of several seconds, allowing time to go to the phone and dial the number. However, if distracted, the number is lost from short-term memory and must be looked up again. The telephone number is only likely to enter long-term memory, and be accessible later, if the person pays attention to the number and processes its meaning and patterns. This deeper processing can include the use of mnemonic strategies.

There are several qualitative distinctions made within the area of long-term memory based on the type of material being maintained. The primary distinction is between declarative memory and nondeclarative memory. *Declarative memory* consists of knowledge that can be verbally stated (declared) and can be further subdivided into two forms, semantic and episodic. *Semantic memory* refers to memory for facts and definitions that are isolated from the specific point in time in which they were acquired. For example, the meaning of the word *astronaut* or knowledge that George Washington was the first president of the United States would be semantic memory.

Episodic memory refers to memory for the events of one's life, for example, remembering what happened at your 6th birthday party, or what you ate for breakfast this morning. Episodic memories tend to be complex memories in which specific persons and objects are related to each other and to time (what time of day, season, year) and place (what location). Episodic memory is typically assessed through tests of recall and recognition; in a recognition test, the person is presented with the memorized material and novel items and just has to indicate whether it was one of the memorized items or not; in recall, a person is given cues but must access the information from memory.

Nondeclarative memory, as its name implies, consists of all the forms of memory that are not declarative. These range across a wide variety of phenomena. One large group is motor skills, such as learning to ride a bicycle. Another is perceptual learning, such as learning to recognize new type scripts or being faster at reading a word when it is repeated. A third is simple forms of learning such as habituation, sensitization, and some forms of classical conditioning.

Cognitively, declarative and nondeclarative memories differ in several interesting ways. First, the information represented in declarative memory is more fully available to consciousness than that represented in nondeclarative memory. This has led to the alternative terms *explicit* and *implicit memory* being used to refer to declarative and nondeclarative memory, respectively. Declarative memory requires more attention for encoding and recall than nondeclarative memory; the latter can often be gained while subjects are simultaneously performing demanding tasks. Declarative memory is more prone to forgetting across time than nondeclarative; this is the basis of the common observation that one never forgets how to ride a bicycle.

The neural bases of declarative and nondeclarative memory also differ. Declarative memory requires structures in the medial temporal lobe (including the hippocampus), the fornix, and the mammillary bodies. These structures serve to encode new memories. People who sustain damage to these areas develop a condition known as *global amnesia*, in which they lose the ability to form new long-term memories. They can still access memories from before their brains were damaged, however. Common causes of global amnesia include stroke, anoxia, Korsakoff's syndrome, and Alzheimer's disease, although the damage in the latter case is not limited to the medial temporal lobe. The medial temporal lobe and related brain structures interact with other areas of the brain, particularly the lateral anterior and middle temporal lobes, and long-term declarative memories are primarily stored in the latter areas.

An important future research question is whether the different parts of the medial temporal lobe serve different functions. Some research indicates that the hippocampus proper is important for learning relationships between items (and thus is important for episodic memory because it involves learning relationships between the person, other elements of the memory, and the time and place of the memory). Memory for specific items involves areas in the parahippocampal gyrus surrounding the hippocampus.

Nondeclarative memory systems have in common that they do not require the medial temporal lobe, but otherwise differ in their neural substrates. Motor skill learning is generally thought to be reliant on changes in motor areas of the brain, including the basal ganglia, cerebellum, primary motor cortex, and premotor cortex. Perceptual learning involves changes in

secondary perceptual cortexes. Classical conditioning is dependent on changes in synapses within circuits connecting perception of the conditioned stimulus and unconditioned response.

Nondeclarative memory is generally considered to have a relatively smooth developmental trajectory. It is present in roughly similar degrees across the entire life span, from infancy to old age. It is thought that much of the learning in prelinguistic children is attributable to nondeclarative memory processes. However, some nondeclarative memory tasks are impaired in older adults, particularly those requiring frontal lobe functioning, which is impaired in old age.

Declarative memory, on the other hand, shows decided changes across the life span. In general, memory is best in early and middle adulthood. One reason for the changes in declarative memory across the life span is developmental changes in the frontal lobes. The frontal lobes are important in implementing strategies to recall information from long-term memory. The frontal lobes are also one of the last areas of the brain to develop fully (full maturation isn't finished until early adulthood) and one of the first areas of the brain to show age-related decline in old age. Thus, older people are particularly impaired in recall and less impaired at recognition.

One interesting developmental phenomenon in memory is childhood amnesia, the finding that permanent long-term memories that can be recalled later in life are rare to nonexistent before an average age of 3.5 years. Young children do form long-term memories; even infants can remember a particularly interesting toy across a time delay of days. However, these memories are typically not accessible later in life. It is unclear what mechanism underlies this phenomenon. Freud postulated that it was due to repressing memories of trauma, although this theory is not generally accepted now. Others have hypothesized that memories become inaccessible as children move from prelinguistic to linguistic phases of development because the conceptual structures in the mind change qualitatively.

Another interesting developmental phenomenon is the distinction between memories of the distant past (e.g., one's 6th birthday party) and memories of more recent events (e.g., breakfast this morning). Older adults often report more difficulty with recent events than events of the distant past. Both are considered to be long-term memory, but they may differ in some psychological and neural mechanisms; this is an important current area of research.

—Carol A. Seger

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LOW BIRTH WEIGHT (LBW)

The United States is unsurpassed in its ability to rescue the very smallest infants; infants who weigh only 750 g at birth are now surviving. However, these rescue efforts are often associated with significant long-term health and developmental problems among survivors. In 1950, the World Health Organization adopted the figure of less than 2,500 g (5 lb, 8 oz) as a universal definition of low birth weight (LBW). Below that, two subgroups are very low birth weight (VLBW—1,500 g; <3 lb) and extremely low birth weight (750 g; 1 lb, 10 oz). In the United States, the LBW rate of 7.6% in 2000 was twice that of other developed nations, and it has not improved. As a result, LBW has become a public health concern focusing on its impact on infant mortality.

TERMINOLOGY: PREMATURE VERSUS SMALL FOR GESTATIONAL AGE

LBW infants are also classified according to whether they are preterm or small for gestational age (SGA). Preterm delivery is the most accurate term to use in describing babies born chronologically too soon, and is defined as a live-born infant born before the end of the 37th week of gestation (compared with full-term gestation of 40–42 weeks). For many years, LBW and prematurity were essentially synonymous.

In contrast, infants who are SGA are those whose birth weight is below normal when the length of the pregnancy is considered. They may be preterm or full term, and they weigh less than 90% of all babies of the same gestational age. Inadequate nutrition and smoking are among the main factors in producing SGA infants.

NEONATAL INTENSIVE CARE UNIT

The development and availability of neonatal intensive care have saved the lives of many LBW infants. Technological and pharmacological improvements during the 1970s and 1980s included fetal monitors, cesarean delivery, neonatal monitoring of heart rate, respiration and blood pressure, intravenous nutrition, phototherapy to treat jaundice, and drugs to treat apnea and heart conditions. Currently, federal child abuse regulations mandate care for all live-born infants unless the infant is irreversibly comatose or is in a condition in which treatment would be "virtually futile" and inhumane by prolonging death. Ethical questions arise for health care providers, families, and society when they must decide if an infant is so sick that neonatal intensive care should be stopped. The probability of survival, pain and suffering, future quality of life, and the economic cost of care must be considered in the care for the very smallest infants.

FREQUENCY

In the United States, there has been an increase in the number of LBW infants in the past two decades (from 6.8 per 1,000 in 1980 to 7.8 per 1,000 in 2002), in part due to the increasing number of adolescents having babies, drug abuse, and poor nutrition. Race differences are also apparent. In 2002, the LBW rate for white infants was 6.8%, compared with 13.3% for black infants. Despite the fact that black infants constitute 17% of all births, 33% of all LBW births, and 38% of all VLBW births, black infants are more than twice as likely as white infants in the United States to be born before 37 weeks' gestation. Race differences are not entirely explained by ethnic differences in the occurrence of various health conditions or behaviors (e.g., smoking, drug use, lack of prenatal care).

CAUSES AND RISK FACTORS

Very little is known about the absolute causes of LBW and preterm birth despite the extensive amount of research. LBW that results from poor fetal growth is associated with cigarette smoking, low maternal weight gain, and low prepregnancy weight. These account for nearly two thirds of all growth-retarded infants. Other risk factors are black race, first birth, prior LBW birth, maternal illness, fetal infections, and a variety of metabolic and genetic disorders. Although many of these risk factors provide important clues about the causes of LBW, many of them are only weakly related to LBW and are generally not modifiable by intervention programs or changes in public policy. Even less is known about the risk factors for early delivery.

SOCIAL DISADVANTAGE AND LIFESTYLE ISSUES

LBW is the primary biological link in the relationship between socioeconomic status and infant mortality in industrialized countries. Researchers have found that virtually all of the indicators of parents' social position (occupation, education, achievement, income, marital status) impact the birth weight distribution. In addition to sociodemographic factors that affect birth outcomes, lifestyle issues also contribute, such as mother's nutrition (weight gain, diet, and nutrient intake); health choices (smoking, alcohol, caffeine, drugs); stress and physical activities; social support; experience of violence; and sexually transmitted diseases. Sadly, this fosters the belief that women are solely to blame for their undesirable behaviors without acknowledging the lack of support from the health care system and society.

COST

The number of children born and surviving LBW has increased, and in parallel, medical technology has continued to improve, and the number of services for LBW children has continued to increase. These advancements come with a price. LBW infants make up 7% of all infants, but 35% of the dollars spent on health care designated for infants goes toward their care, with nearly half of these dollars going toward the care of the tiniest infants. Hospital bills for rescuing only one of these tiny babies can reach more than 1 million dollars. Initial hospitalization costs associated with LBW include physician fees and an average hospital stay of 3 to 4 months, much of which is spent on life-support equipment. Rehospitalization costs during the first year of life and long-term support services

(e.g., institutional care, special education) also contribute to the high cost of surviving LBW babies. The extra time that parents of sick LBW babies devote to their care is another component of cost not typically factored in.

LBW children do not necessarily outgrow many of their health problems as they mature. For those who survive infancy with chronic health problems, use of inpatient and outpatient health care services may remain high and access to specialized developmental services may become important. In comparison with normal birth weight children, LBW preschoolers are twice as likely to be hospitalized, and they spend more time in the hospital once admitted. They are also 50% more likely to be enrolled in special education programs, more likely to miss school days because of illness, and more likely to repeat grades in school.

PREVENTION AND TREATMENT

From a public health perspective, two major strategies to reduce the number of infant deaths in the United States are to (1) prevent LBW and preterm delivery, and (2) improve the survival of LBW infants. Where available, prevention and enrichment programs have been effective in servicing families with LBW children. A relatively simple recommendation for prevention involves smoking cessation; up to 20% of *all* LBW births could be prevented if no pregnant woman smoked cigarettes. The most common public health recommendations for preventing LBW and preterm births include developing women's health programs that include prepregnancy counseling, and providing health care resources and insurance coverage devoted to prenatal smoking cessation programs.

If preventive actions are not taken, intervention programs may be accessed. Many early hospital-based interventions incorporate human touch, or massage, which has been proven to improve infant activity levels, alertness, and performance on developmental tests. Several neonatal programs include infant educational enrichment in combination with parent support programs. Intensive enrichment programs that provide medical, educational, and social support services for the parents and child have been shown to improve short-term developmental outcomes for LBW children. Infants who benefit the most from these programs have mothers who have high school or less than high school education levels.

DEVELOPMENTAL CONSEQUENCES

Survival and Risks

The increase in the rate of survival for LBW infants is so large that it is now having an impact on the childhood population. Most infants born at 24 or more weeks of gestational age (GA) survive. For infants born before 24 weeks' GA, 10% to 40% survive, and at 22 weeks' GA, almost no infants survive. The risk for severe handicap in VLBW survivors (e.g., cerebral palsy, epilepsy, or blindness) is about 20%, and of the nonhandicapped remainder, at least one third will experience substantial school difficulties. Medical and biological factors that contribute to the risk associated with LBW include birth defects, male sex, birth asphyxia, and neonatal complications including severe brain damage, chronic lung disease, meningitis, seizures, hypoglycemia, and jaundice.

A different picture emerges for *moderately* LBW groups who do *not* require intensive care; this group has not been well studied. Most moderately LBW children function within the normal range, yet when compared with normal birth weight children, LBW children have higher rates of mental retardation, cerebral palsy, blindness, deafness, psychomotor problems, school failure, and subnormal growth health problems. The number and severity of these problems increase as birth weight decreases.

Outcomes

Depending on the severity of health problems, LBW children may experience combinations of various health, neurosensory, and developmental problems that can worsen clinical and educational outcomes. LBW children experience more physical and health problems than children with normal birth weights, beginning with lower average weight, height, and head circumference. Poor health outcomes increase as birth weight decreases, including asthma, upper and lower respiratory infections, and ear infections. Rehospitalizations for medical conditions and surgeries may be needed for the eyes, ears, nose, and throat; orthopedic surgery may also be warranted for cerebral palsy.

Cerebral palsy is the most common major neurological abnormality seen in LBW children, and cognitively, these children score significantly lower on intelligence tests than do children of normal birth weight, even when sociodemographic risk factors are taken into account.

Evaluations may reveal problems with specific cognitive functions, such as language abilities, memory, attention, fine and gross motor coordination, perceptual-motor skills, and nonverbal reasoning and problem solving. By school age, LBW children are more likely than those with normal birth weights to have a learning disability or attention deficit disorders.

In addition to the various health outcomes possible for LBW children, social and environmental factors can worsen long-term outcomes. For example, the combination of severe neonatal illness and a deprived environment that can barely meet basic food and shelter needs can be devastating. Impoverished environments may also include elements of neglect ranging from exposure to environmental hazards to financial devastation to abuse.

POLICY IMPLICATIONS

Fortunately, public laws have come into place, and this reflects the importance of early intervention services for infants born LBW. Public Law 94-142, passed in 1975, mandated services for disabled children 6 years of age and older. Part B of Public Law 99-457, passed in 1986, mandated services for disabled children 3 to 5 years of age, and Part H of this legislation created a family-based service model for children from birth to 2 years. In addition to these policies, public health recommendations call for provisions to prevent prematurity as part of prenatal care and mandate comprehensive follow-up of LBW children until school age. Such a mandate would include referral to early intervention services for those most in need and offering parent support and education programs to enable parents to meet the complex needs of preterm children.

—AnnJanette Alejano-Steele

See also Very Low Birth Weight Children (VLBW)

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M

Marriage

A successful marriage requires falling in love many times, always with the same person.

—Mignon McLaughlin

MADD (MOTHERS AGAINST DRUNK DRIVING)

Mothers Against Drunk Driving (MADD) is a grassroots organization with more than 2 million members and local chapters throughout the United States, Canada, Guam, and Puerto Rico. It is estimated that since MADD's inception in 1980, alcohol-related traffic fatalities have declined 43%. In 1980, 55% (28,100) of the nation's 51,091 traffic deaths were alcohol related. By 1999, alcohol-related deaths comprised 38% (15,794) of the nation's 41,345 traffic fatalities.

The organization began in 1980 as Mothers Against Drunk Drivers. It was inspired when 13-year-old Cari Lightner was killed by a drunk driver in California who just 2 days earlier had been released on bail for a hit-and-run drunk driving accident. He had two prior drunk driving convictions, and a third charge had been plea-bargained to "reckless accident." Cari's mother, Candace Lightner, gathered forces with a group of friends in Sacramento to fight to keep drunk drivers off the road, and Mothers Against Drunk Drivers was formed. Another chapter was formed shortly afterward in Maryland by Cindi Lamb, whose 5-month-old daughter Laura had become a quadriplegic the year before when they were hit by a repeat drunk driving offender speeding at 120 mph. MADD's growth began to accelerate as it started receiving national attention. In 1982, President Reagan formed a presidential task force on drunk driving and invited MADD to serve on it. In March 1983, NBC produced a made-for-television movie about Candace Lightner's story and the formation of MADD, and more than 120 new chapters were formed that month alone. In 1984, the name was changed to Mothers Against Drunk Driving, reflecting the emphasis on the act of drunk driving, not on the individuals involved. Currently, MADD has over 600 chapters and is the nation's largest crime victim's assistance organization.

The stated mission of MADD is to stop drunk driving, support the victims of drunk driving, and prevent underage drinking. This mission is supported by efforts in four main areas: public awareness, victim assistance, youth programs, and public policy.

VICTIM ASSISTANCE

MADD sponsors a 40-hour advocate education training program that has been completed by more

than 1,200 victim advocates. These advocates assist drunk driving victims through toll-free numbers, local advocate services, and assistance with the legal process, as well as a range of books and publications developed by MADD.

PUBLIC AWARENESS

MADD popularized the concept of "designated drivers" in the 1980s as a means to help keep drunk drivers off the roads. Project Red Ribbon was also introduced in the mid-1980s, and red ribbons were displayed by motorists who pledged to drive sober during the Christmas and New Years holidays. MADD continues to focus on public awareness through media campaigns and various education efforts.

YOUTH PROGRAMS

Preventing underage drinking has increasingly become a focus of the organization. MADD currently conducts a host of programs targeting youth, including alcohol-free prom parties, speeches in high schools, and resource materials such as classroom newsletters and even coloring books for the younger grades. Since attitudes about drinking are formed at a young age, MADD begins with elementary age children and has developed the program Protecting You/Protecting Me, which has been recognized by the federal government as a scientifically proven effective prevention program. In 1997, the first MADD National Youth Summit to Prevent Underage Drinking was held, and in 1998, the first youth representative to MADD's Board of Directors was elected.

PUBLIC POLICY

MADD claims that their efforts have resulted in the passage of thousands of federal and state drunk driving laws since the early 1980s. These have included the passage in 1984 of a federal law requiring all states to increase the legal drinking age to 21 or lose highway funding, the 1988 Omnibus Anti-Drug Abuse Act, which grants victims of driving while intoxicated (DWI) crashes the same compensation rights as victims of other crimes, and a push for states to reduce the legal blood alcohol concentration from .10 to .08. MADD has been involved in the passage of more than 2,300 state and federal anti–drunk driving and underage drinking laws and has advocated for stricter penalties for repeat drunk driving offenders across the country.

—John C. Wade

See also Alcoholism, Drunk Driving

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MAGICAL THINKING

Magical thinking involves the belief that one's ideas, thoughts, actions, words, or use of symbols can influence the course of events in the material world. Magical thinking presumes a causal link between one's inner, personal experience and the external physical world. Examples include beliefs that the movement of the sun, moon, and wind or the occurrence of rain can be influenced by one's thoughts, or by the manipulation of some type of symbolic representation of these physical phenomena.

Magical thinking became an important topic with the rise of sociology and anthropology in the 19th century. It was argued that magical thinking is an integral feature of most religious beliefs, such that one's inner experience, often in participation with a higher power, could influence the course of events in the physical world. Prominent early theorists suggested that this type of thinking characterized traditional, non-Western cultures, which contrasted with the more developmentally advanced rational-scientific thought found in industrialized, Western cultures. Magical thinking, then, was tied to religion and "primitive" cultures and considered developmentally inferior to the scientific reasoning found in more "advanced" Western cultures.

This perspective influenced 20th-century psychological theorists, notably Sigmund Freud and Jean Piaget. Freud argued that there are two fundamental forms of thought: primary and secondary process. Primary process thought is governed by the pleasure principle, whereby id-driven instinctual desires seek fulfillment without consideration of the constraints of the external world. Magical thinking—the belief that wishes can impose their own order on the material world—is a form of primary process thought. Secondary process,

in contrast, is a more advanced development, resulting from the emergence of the ego, which provides rational assessments under the direction of the reality principle, that allow for adaptive responses to the environment. Freud used this model of individual development to explain the stages of cultural development proposed by anthropologists. That is, the ontogenetic development of the individual—from the id impulses and magical thought of childhood, to the ego constraints and rationality of adulthood—mirrors the phylogenetic development of human cultures from magical-religious to rational-scientific.

Piaget's investigation also placed magical thinking at the center of young children's thought. Piaget queried children about their understanding of events in the physical world and discovered that children, prior to the age of 7 or 8, impute their own activity as the causal source for physical events. So, for example, children believe that their own activity causes the motion of the sun and moon and that waving their hands causes the wind. Magical thinking, Piaget argues, results from a profound egocentrism, of experiencing oneself as the center of the universe, and a lack of differentiation of intrapsychic experience and physical causality. This qualitatively distinct developmental stage is superseded by a differentiation of the intrapsychic from the material world, a decentration of thought, and the capacity for logical, scientific reasoning. Again, magical thinking is replaced by rational, scientific thought. And while less programmatically explicit than Freud, Piaget also argued that these stages of ontogeny recapitulate the progressive stages in the development of cultures, from magical-religious to rational-scientific.

Recent research suggests that magical thinking is both less and more pervasive than previously thought. First, evidence suggests that although young children do utilize magical thinking, their egocentrism is much less pervasive and profound, and they are capable of a much more sophisticated understanding of physical causality, at a much earlier age, than Piaget proposed. Second, adults, despite their capacity for scientific reasoning, do hold religious beliefs that often involve features of magical thinking, engage in magical thinking at times, and can be influenced to think thusly under some circumstances. Third, the magical thinking of children may be distinct from the religious beliefs of adults, which address metaphysical considerations about ultimate questions of life, meaning, being, and mortality that involve more sophisticated cognitive considerations than found in children's magical thought.

—Brian Vandenberg

See also Cognitive Development

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MALNUTRITION

In most normal, healthy children, the genetic potential is helped toward fulfillment by healthful, invigorating environmental conditions. The quality of children's nutrition and health care strongly influences their development and the general quality of life they experience.

Unfortunately, a majority of children in the world, and many of the children in the United States, receive neither proper nutrition nor adequate medical attention. They do not get enough protein for building body cells, enough vitamins and minerals for structural development, or enough carbohydrates for energy. All over the world, tens of thousands of children die each day of hunger, a situation that is difficult to believe can actually happen. In the United States alone, the estimates of children who experience hunger range from 2 to 5 million, which is likely to increase as economic circumstances for the poor become even more precarious. What makes these tragedies even more unbelievable is that the reason for these deaths is not food shortages, but the politics of food.

When people are poor, they are usually malnourished. Chronic malnutrition, which more often than not begins before birth, can produce permanent physical deformities and mental incapacity. Unfortunately, this damage stays with the child and may interact with other dimensions of the child's development. Sandy Zeskind and Craig Ramey studied the effect that two settings, different in their intellectual stimulation, might have on fetally malnourished children.

The results of the study showed that the negative effects of malnutrition on intellectual, behavioral, and social development continued through 3 years of age when the environment was not supportive. On the other hand, in a supportive environment, the effects of malnutrition continued to decrease.

Malnutrition can result from the consumption of "junk foods" that provide only "empty calories," that is, refined carbohydrates. In a consumer-oriented culture like ours, it is difficult to keep a child from eating presweetened cereals and candy bars and drinking soft drinks. Day after day the child sees this kind of food recommended on television by favorite cartoon characters and TV personalities. Yet when junk foods make up a large part of the diet, the result may be nutritional deficiencies, often accompanied by obesity. It is not unusual for the child who is overweight to also be undernourished.

Illness in young children because of nutritional deficiencies is also a particularly serious problem among the poor in the United States, and as the number of poor children increases and as health care availability declines, even more children are suffering the effects of malnutrition. Although each generation tends to produce larger, healthier babies than the generation before it, millions of children continue to suffer from respiratory illness, bad teeth, and other conditions related to an inadequate diet. Many pediatric specialists in this country have assailed the health care system, especially its inadequacy for poor children.

Children who eat poorly will suffer as adults as well. According to some nutrition researchers, the average American's diet promotes heart disease, tooth decay, diabetes, high blood pressure, and certain common cancers. A report by the National Institutes of Mental Health discussed the link between diet and cancer and how reducing red meat and fat consumption and increasing fiber intake may lessen one's chances of contracting cancer.

Preferences for foods that constitute an unhealthful diet start early in life. Parents may offer sugar-rich foods as a reward or a distraction or an attempt to show their affection ("Here, have a cookie and stop crying"). Desserts rich in sugar and fat may be served to the family as a show of love and affection, and in some cases this can be the beginning of more serious eating disorders of the kind we will discuss later. Salty foods are now considered by many medical researchers to be even more unhealthful than sweets. A cursory look at cereal packages in the stores finds that even the "high-nutrition" packaged cereals contain 10 times the necessary sodium levels in a 1-ounce serving. The saltine or pretzel so often offered to placate children is really no better than a cookie. A raw carrot, a quarter of an apple, or a slice of rye or whole wheat bread will soothe a child just as well. In order to reduce salt intake, salads and cooked foods can be liberally seasoned with herbs. A variety of foods should be offered, although many children tend to be conservative in their food choices. A nutritious (and delicious) dessert can be part of the meal and not a reward. Another good principle is to allow children to leave food on their plates if they wish. Better yet, give small servings to start and then more if desired. This strategy helps avoid wasting food and eliminates some of the tension that can arise over "cleaning your plate." After a great deal of controversy, the federal government has finally settled on a set of nutritional guidelines. The typical four food groups (cereals, dairy, meat, and vegetables and fruit) are gone, replaced by a pyramid with bread, cereal, rice, and pasta at the bottom (signifying the most servings) and fats, oils, and sweets at the top (signifying the least). The guidelines suggest a change in the federal government's view on nutrition, now stressing a low-fat and low-cholesterol diet.

—Neil J. Salkind

See also Poverty

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MARIJUANA

Although the marijuana, or cannabis, plant first appears in human history approximately 10,000 years ago, there is limited research that tells us about its role in human development. Indeed, this plant with hundreds of active chemicals when smoked remains a mystery to many, although with over hundreds of millions of

people in the world having used it at least once, it is by far the most widely used substance. What many people believe to be true of this plant is often more myth than fact.

A BRIEF HISTORY

The industrial strain of the cannabis plant, known as hemp, has been used at least as far back as 8000 BC, when it was used in Taiwan as decoration. Industrial hemp plants do not contain enough of the most potent chemical, tetrahydrocannabinol (THC), which is found in strains of cannabis, to produce euphoria and other mild mind-altering effects, in addition to pain relief and other assorted effects. Medical uses for cannabis, or marijuana, began in China around 2700 BC. This hardy plant is extremely pest resistant and currently grows wildly on six continents.

Marijuana is actually a slang term, originating in Mexico, for the cannabis plant. Cannabis was first used prominently in North America at the beginning of the 20th century, and largely by Mexicans and Mexican immigrants in America. As alcohol prohibition waned, and the federal government in the United States saw a new scourge in this intoxicating plant from the south, they used its Mexican slang name in order to enhance its foreign association and encourage its prohibition among the general public.

CURRENT EFFECTS

That history is important, because although widely used, marijuana is much misunderstood. It has been a schedule I drug, meaning the United States government deems it to have no medical application or value, since the beginning of drug scheduling in the United States. Some relevant facts that are often overlooked by the lay public include (a) marijuana has never been linked to a fatal overdose; (b) it has been shown to give effective relief for some ailments, including glaucoma and the pain and shaking of multiple sclerosis, to increase appetite in patients with acquired immunodeficiency syndrome (AIDS) wasting, and to ease discomfort associated with chemotherapy; and (c) it is less toxic than either tobacco or alcohol. An estimated 30 million Americans currently use marijuana at least once a month, and some would say they are using its properties to self-medicate. Yet there is little we can say regarding scientific surveys into marijuana's role in human development, as it has been virtually impossible to conduct meaningful research on the drug itself, because its schedule I classification makes it extremely difficult to study legally in the United States.

What little research that been done has demonstrated that the cannabinoids are the primary chemicals in marijuana that produce effects in the human brain. The human brain has cannabinoid receptors, which also react to chemicals produced within the body, producing such effects as "runner's high." These cannabinoids, especially delta-THC, generally affect aspects of memory, perception, and complex reaction time. They also seem to enhance senses and increase euphoria and relaxation, but may impair some concentration.

At young ages, while the brain is still forming, it is thought that there may be long-lasting effects with continued use, but there is scant evidence to either prove or disprove this theory.

CONCLUSION

Although not a benign drug, marijuana does have documented applications for certain illnesses when administered in appropriate doses. More study is certainly needed to obtain definitive answers to marijuana's short- and long-term effects on human development.

—Francis DellaVecchia and Robert March

See also Drug Abuse

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MARITAL EQUITY

Marital equity refers to the degree of balance of authority, power, or influence between spouses. There are multiple domains related to marital power, including, for example, each partner's education background and economic contribution; each spouse's ability to

use communication skills to influence the other partner; and how much each partner has a say in decision making. In all of these areas, there can be equity or there can be imbalances in power. Marital equity also can be seen as the extent to which each partner has status in the relationship and whether that status is equal between partners.

Marital equity has been studied in many ways. Researchers have learned valuable information through several methods. First, spouses can be asked about their own background and their perceptions of their own and their spouse's power and influence in the relationship. They can also be asked about who makes the final decisions in the relationship and whether there are differences in who has the final say across different areas, such as how to spend money or raise children.

Second, couples can be observed while discussing important issues in their marriages, such as how to solve problems. Observing these problem discussions has revealed that there are different types of power distribution across couple relationships. There are "egalitarian" couples, where both partners share equally in decision making and appear to have the same levels of influence on one another. Some couples have a female partner who is more forceful, may talk more than a male partner, and may appear more influential. These couples have been labeled as "female dominant," while "male dominant" couples show the opposite pattern. A fourth group of couples has been labeled "imbalanced" or "power struggle," in which partners appear to be struggling with each other for control or the upper hand in the interaction.

By asking spouses about their relationships and by observing couples in problem discussions, researchers have learned that the health of a marriage can be affected by the balance of power or equity in the relationship. For example, if one partner feels bullied by the other, it can lead to dissatisfaction in the marriage and high levels of conflict. On the other hand, if both partners feel they have equal status and are listened to by each other, they may report higher levels of satisfaction in the marriage. It may also be the case that with certain types of decisions, one partner has the final say, while with other types of issues, the other partner may make final decisions.

The distribution of power in a relationship may vary by culture and ethnicity. Some evidence suggests that Anglo-American couples tend to value egalitarianism highly, and if there is an imbalance in power, it may lead to relationship dissatisfaction. There is also some evidence in some other cultural groups that egalitarianism may not be as highly valued, and therefore partners may have separate spheres of influence, or varying levels of influence, which may not lead to dissatisfaction.

One important research finding about marital equity is that it can be related to one of the most significant disruptions in a couple relationship: domestic violence. Evidence exists that domestic violence in a relationship can coincide with high levels of power imbalances. Violent spouses sometimes report that they feel powerless in relationships, and some researchers have suggested that because they feel powerless, partners who are violent toward their spouses may do so in order to regain power in the relationship. It is therefore very important to address issues of marital equity with couples, since they may be dealing with varying levels of happiness or, in some cases, dangerous behavior associated with the balance of power within the relationship.

—Neena M. Malik

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MARRIAGE

MARRIAGE AS AN INSTITUTION

The first recorded history of marriage as an institution was gleaned from the ancient civilizations. In "civilized" societies, women were considered property owned by men, first by their fathers and then by their husbands. Early Romans and Greeks often gave women to men as prizes for some heroic deed. Wives had to be faithful to their husbands, while husbands could have concubines. Archeological and

anthropological studies have shown that other early forms of marriage were thought to exist in Polynesia. Before Christian missionaries arrived, the Polynesian men and women were thought to have had many partners who formed unions out of love. The Christian missionaries defined marriage as a union between one man and one woman (monogamy) and changed the nature of Polynesian marriages to fit their beliefs. Other cultures condoned polygamy, in which one man could have several wives.

When royal families dominated the Western world, the motive for marriage was often to create a political alliance between countries through royal blood. Later, when the power of royalty declined, money replaced bloodline as a source of power. Then marriages were entered into for economic convenience. Although the Polynesians were believed to marry for love, marrying for love was not a typical reason for marriage in the Western world until the Victorian Age. Whereas many cultures still had arranged marriages and marriages of convenience, marriage by choice was popular in the newly formed United States. However, the choice of marriage partner was officially made by the man, not the woman. A woman had no legal rights of her own in many cultures. In Western society in the 17th through 19th centuries, she was known legally as "the wife of Mr. Smith or Mrs. John Smith," for example, and continued to be her husband's property. A woman's status in society was determined by the status of her husband. Thus, if a woman wanted some semblance of power, she had to marry a powerful man. Even then, whatever status she did have was only obtained through marriage.

In the United States and much of the Western world, the definition of marriage has changed to include many different forms of marriage. Marriages between same-sex couples have been legalized in some jurisdictions. This legalization has heightened the controversy surrounding gay and lesbian couples. On the one hand, same-sex couples want the same legal rights as married heterosexual couples. On the other hand, the major religions of the United States do not condone same-sex marriages. Such critics believe that legalizing gay marriage would violate the sanctity of marriage. Yet research shows that marriages began to change long before gay couples sought legal recognition. Heterosexual couples often live together without marriage, and many stay committed to the relationship without a marriage license. Women now choose to have children without marrying or involving fathers in child rearing. Divorce occurs frequently and no longer carries the stigma it once had. To some, legalizing same-sex marriage is just another step in the path to redefining marriage as an option for couples, whether or not children are involved. At the time of this writing, the controversy over gay marriage continues.

MARRIAGE AS A RESEARCH TOPIC

The history of marriage as a research topic did not begin until the 1920s. Before that time, ideas about marriage were not scientific, but rather in the form of traditional religious prescriptions for an ideal marriage. At the turn of the 19th century, when problems in marriages and families were acknowledged as societal problems, a focus on the marital ideal was replaced with a focus on direct observations of actual marriages. The desire to solve problems in marriage led to many years of research on marital quality. The goal of these studies was to determine what predicted marital success.

The first research studies on marriage were primarily sociological studies, surveying large segments of the population and using demographic data (e.g., age, income, education) to identify the individual factors that predict marital satisfaction. Then clinical psychologists became interested in marital research in order to design therapeutic techniques to solve marital problems. However, demographic data did not explain the reasons that problems occurred. Researchers began to realize the need for studying the behaviors of spouses during interactions with each other. Such research demonstrated that interpersonal interactions capture valuable information that cannot be found by examining individual characteristics. Behavioral observations of marriages became a very popular and useful method for distinguishing the behaviors between happy and unhappy marriages. Often couples were observed while discussing their own marital problems. It was assumed that knowing how happy and unhappy couples behaved during discussions of problems could help design marital interventions. Such interventions would presumably teach couples what to do and what not to do in order to improve the quality of their marriages.

In the late 1970s and early 1980s, the study of personal relationships began to emerge. Such research gave marital researchers who were not clinically oriented a forum in which to present their work. Sociology and clinical psychology once dominated the study of marriage, but relationship research is now a multidisciplinary endeavor, including such disciplines as social

and organizational psychology, communication studies, and anthropology. Although marital quality remains as a major focus of research on marriage, many other areas of study have been examined. Behavioral observation is still a valuable method, and research on marriage has expanded to include spouses' perceptions and thoughts about themselves and each another. Coupled with observational research, investigators can identify what spouses are thinking while they are interacting, paving the way for a multilevel image of marital interaction.

There are so few studies examining marriage in different cultures that it is not possible to present a universal definition of an ideal marriage. Much of what is presented below as the successful marriage is based on research in the United States, Canada, and Western Europe and thus reflects the values of the Western world.

MARITAL QUALITY

There are many different processes and characteristics that make up a successful marriage. Marital satisfaction and stability are thought by most researchers to be the barometer of marital quality and are thus predominant foci of marital research. Instead of presenting an exhaustive list of behaviors and characteristics that comprise a successful marriage, this entry will focus on one process that many researchers agree to be important to marital satisfaction—communication.

Communication is often touted as the crucial component of successful marriages without specifying the type, style, and context of communication. A distinguishing characteristic of satisfied versus dissatisfied couples is the way they communicate about a disagreement, problem, or conflict. Happy couples are less likely to blame each other for problems and more likely to shift the conversational focus to more constructive ways of communicating. If one partner starts saying something destructive or negative, the other partner does not automatically respond with another negative statement. In satisfied marriages, one partner or the other is able to reframe the problem in constructive terms. They are more able to shift focus to see their problems as something they work on together, rather than as the responsibility or fault of the one spouse. Satisfied spouses are flexible and can shift from a focus on the self or the other partner to a focus on the relationship.

Unhappy marriages are those in which conversational styles are rigid and inflexible. When one spouse says something negative, the other spouse responds in kind. Thus, a negative remark can turn into a series of negative exchanges without resolution. When discussing a problem or conflict, the couples seem stuck in a vicious cycle in which the conversation becomes more and more destructive. If time and again they are unable to shift their focus from partner blame to a relationship problem, negative feelings toward one another can eventually turn into contempt. Once that vicious cycle starts, it is very difficult for distressed couples to stop the negativity. Satisfied couples, on the other hand, are able to shift from a destructive to a constructive conversational style.

CONCLUSION

In the past century, beliefs about marriage as an institution have undergone rapid change in the United States. In addition to adapting to the industrial and technological changes in this society, attitudes about marriage also responded to increases in the freedoms and choices among women. As women gain more status in society in general, they also seek more power in the marital relationship. Because men were thought to be the traditional heads of households, more power for women was expected to lead to more equality in marriage. As women gain more status in the workplace and household, men are expected to take on more tasks traditionally thought of as women's work (e.g., housekeeping and child rearing). Research has shown that attitudes do not match behavior in marriage. Husbands are not increasing their share of the household labor to match that of wives, but there are some marriages that are built on equity and equality. These are termed peer marriages, marriages that distribute power in ways that satisfy each partner and at the same time preserve the relationship and do not rely on traditional gender roles as guidelines. These are marriages in which the spouses are equals. Although true peer marriages are in the minority, the majority of marriages strive to be more egalitarian. It is these marriages we know the most about. Peer marriage remains a model to which most marriages aspire.

If a young couple gets married today, projections indicate that at least 40% of them will end in divorce. Unfortunately, the majority of couples seeking marital therapy do so when the marriage seems beyond repair. Thus, several marital researchers and therapists want to help couples by teaching them about making relationships work before they get married. Educating

premarital couples about marriage is a hopeful trend that holds the promise of preserving marriages of the future.

—Linda K. Acitelli

See also Common Law Marriage

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MASLOW, ABRAHAM (1908–1970)

Abraham Maslow pioneered and led the humanistic psychology movement. He was born in 1908 in Brooklyn, New York. The oldest of seven children from parents who immigrated to the United States from Russia, Maslow was quoted as describing his childhood as miserable and his family as unhappy and unloving. For Maslow, study and education provided a way to overcome poverty and loneliness. His desire was to study "everything," earning a bachelor's degree from City College in New York and his PhD from the University of Wisconsin in 1934 in experimental psychology. Learning was matched by a passion for his friend and cousin, Bertha Goodman. He was 20 and she was 19 years old when they married on December 31, 1928. The marriage provided Maslow with a feeling of belonging and a sense of direction.

Mentored first by Harry Harlow and later by Alfred Adler, anthropologist Ruth Benedict, and Gestalt psychologist Max Wertheimer, Maslow is credited with developing humanistic psychology, the "third force" in psychology, which provided an alternative to the prevailing psychoanalytic and behavioral models of his time. Rather than working with individuals in a clinical setting, Maslow wanted to study and focus on the best examples of humanity in order to gain insight into human nature.

Maslow laid the groundwork for what has now become his classic theory on self-actualization by making the assumption that each of us has an intrinsic nature that is good, or, at the very least, neutral. He conceptualized a hierarchy of needs that activate and direct human behavior. These needs, arranged in order from strongest to weakest, include physiological, safety, belongingness and love, esteem needs (from self and others), and ultimately self-actualization. The lower needs must be at least partially satisfied before higher needs become influential, and according to Maslow, only a minority of individuals actually progress to the highest, self-actualizing level.

Self-actualization depends on the maximum realization and fulfillment of our potentials, talents, and abilities. Self-actualization is not limited to particular occupations or interests. It is the process of maximizing personal abilities and reaching the fullest personality development. Environments that threaten the individual and do not allow for the satisfaction of basic needs are detrimental to growth, while those that are supportive and provide for the gratification of needs promote growth toward self-actualization.

Maslow taught at Brooklyn College for 14 years, and then at Brandeis University from 1951 to 1969. Maslow was President of the American Psychological Association in 1967. That same year, he accepted a fellowship at the Laughlin Foundation in Menlo Park, California, to devote all his time to writing. Unfortunately, he died of a heart attack in 1970, at the age of 62, leaving behind his profound influence on psychology.

—Michelle Bayer and Karen E. Mottarella

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MATERNAL HEALTH

Pregnancy and childbirth is perhaps one of the most awe-inspiring feats of the female body. During the perinatal period, a woman's body transforms so as to promote and support the development of a new life. Throughout this process, the health of the mother and developing offspring are inherently intertwined. Not only is maternal health critical for the mother, but it is the fundamental necessity for the successful unfolding of potential of the developing child.

WHAT IS MATERNAL HEALTH?

Maternal health involves unique functions and abilities of the female body and generally refers to physical and psychological functioning before and during pregnancy, childbirth, and labor, continuing to postpartum status. A more limited definition views maternal health as simply the absence of disease and even goes so far as to define childbirth and pregnancy as a pathological process. Critics of this "illness" model suggest that maternal health is not merely the absence of illness, but is a process of moving toward optimal functioning and well-being with the woman playing an active part.

A holistic definition of maternal health emphasizes that health is influenced by how a woman thinks, feels, and behaves, with bidirectional influences between the individual woman and her social and contextual surroundings. This definition recognizes the importance of support from significant individuals and the community and delineates a more active role for the mother in her health. The traditional "illness" model depicts the individual as more passive and dependent on health care providers to eliminate or treat illness and achieve health. Current models employ a more self-empowered view of a person's health by which women have more responsibility for the management of their prenatal and postnatal terms. This paradigm shift has changed the role of health care providers to not only treat pregnancy-related complications, but to additionally provide support and suggestions (teacher/adviser role) and to help mothers acquire the knowledge and skills necessary to choose and employ optimal health behaviors.

MATERNAL HEALTH INDICATORS

Whereas an obvious measure of health is assessed by physical indicators (e.g., complications), it is important to recognize that maternal behaviors and experiences are important aspects of health as well. The existence of a positive and supportive environment for the psychological and physical needs of the mother, as well as infant and family, is critical in promoting optimal conditions for a successful gestational term and delivery.

Pregnancy-Related Physical Complications and Deaths

Maternal mortality is the number of deaths from complications related to or aggravated by pregnancy or its management that occur during or within 42 days after pregnancy. Maternal mortality can be due to the direct effects of pregnancy or medical interventions as well as to indirect effects where pregnancy aggravates a preexisting or unrelated physical condition.

Monitoring and measuring maternal mortality is difficult and subject to misclassification and other measurement errors, especially in countries where deaths are not adequately and standardly reported and classified. However, the World Health Organization (WHO), United Nations Children's Fund (UNICEF), and United Nations Population Fund (UNFPA) estimate that 529,000 maternal deaths occurred globally in the year 2000, with the highest death numbers and rates in Africa and Asia. More developed regions in the world account for a very small percentage of pregnancy-related deaths. However, even in the United States, maternal mortality rates have not dropped since the early 1980s, and black and Hispanic women have disproportionately high pregnancy-related

deaths. It is thought that many of these deaths could be prevented through improvements in health care quality, access, and utilization, as well as changes in lifestyle and health-related behaviors. The most common causes of pregnancy-related deaths in the United States are hemorrhage, embolism (artery blockage), pregnancy-induced hypertension (high blood pressure), sepsis (infection), anesthesia complications, and cardiomyopathy (disease of the heart muscle).

Maternal morbidity refers to the number of cases of pregnancy-related complications before, during, and after delivery at a certain point in time. The three most common complications of pregnancy include pregnancy-associated hypertension, diabetes, and anemia. Women over 35 years of age have higher rates of complications such as diabetes, cardiac disease, and chronic hypertension compared with younger women. Medical complications during pregnancy contribute to maternal mortality as well as infant morbidity and mortality. For women of normal weight prior to pregnancy, a weight gain of approximately 23 to 35 pounds is recommended. Excessive gestational weight gain is associated with greater postpartum weight retention and higher rates of obesity. Psychological morbidity related to pregnancy includes depression and is addressed in the next section.

Psychological Aspects of Maternal Health

Pregnancy involves a tremendous amount of change in body size, shape, and physiology. This dramatic metamorphosis of the body is accompanied with all the changes and adaptations that come with the preparation for a newborn. It is no wonder that women often feel a range of emotions, from happiness and elation to fear and anxiety, as they anticipate and prepare for motherhood. Pathological reactions (e.g., neuroticism, psychosis) during pregnancy are rare, and it is quite normal and adaptive for a woman to experience some emotional disequilibrium during this major life development.

Dramatic fluctuations in hormones such as estrogen and progesterone occur during pregnancy and delivery and may contribute to depression during and following pregnancy. However, depression is complex and not completely explained by biochemical events. Life stresses, a difficult pregnancy, dysfunctional relationships, ruminative thinking, and poverty are examples of psychological and social factors that also may contribute to depression during and following pregnancy. Depression is a major health issue and burden among women and appears to be especially prevalent in women during pregnancy and the postpartum period. An estimated 15% to 20% of new mothers experience postpartum depression, with rates even higher for women who have had high-risk pregnancies. Depression following pregnancy can adversely impact the mother-child attachment and other family interactions. Depression during pregnancy can lead to physiological effects that are detrimental to prenatal development and are associated with low infant birth weight and prematurity.

The fluctuations of hormones during and after pregnancy do not necessarily result in negative reactions or depression. A body of evidence shows that oscillations in hormones such as oxytocin and cortisol following pregnancy actually facilitate mother-infant bonding and may even buffer stress reactions. Psychological reactions, whether positive or negative, develop from the interaction of a number of influences such as hormonal changes that occur during pregnancy and delivery, the physical health of the mother, a woman's perception of and attitude toward the pregnancy, and the existence of supportive and positive relationships with others.

Maternal Health in a Social Context

Women do not have babies within a social vacuum, and the social context of pregnancy and childbirth are important considerations in maternal health. A strong support system can be essential in helping a woman obtain prenatal care as well as engage in behaviors that promote health of both the mother and the infant. A woman's pregnancy and baby's arrival often coincide with the highest rates of strain on the existing marriage or relationship. Simultaneously, it is during this time that a woman's health would benefit significantly from nurturant behavior from her partner—such as massages to alleviate distress and help her manage stress.

Violence against women during pregnancy is increasingly being recognized as a major issue in maternal health, affecting an estimated 4% to 8% of pregnancies in the United States—rates rivaling the incidence of conditions of pregnancy for which women are routinely screened. There is no single profile for a perpetrator or victim; however, intimate partner violence is related to factors such as an unintended

pregnancy and substance abuse. Physical abuse during pregnancy is associated with elevated risks for pregnancy complications such as hemorrhage, low birth weight, and perinatal death.

MATERNAL BEHAVIORS AND CHILD HEALTH

Maternal health begins prior to conception and is promoted by a healthy lifestyle and proper nutrition throughout the pregnancy and postpartum period. Whereas some risk factors for gestational development and infant health are not modifiable (e.g., genetics), many risk factors can be influenced by maternal behaviors. Recommended behaviors for optimizing infant health include getting prenatal care and infant checkups; taking precautions to avoid infection; eating a well-balanced diet rich in folic acid, calcium, and B vitamins; and avoiding alcohol, cigarettes, and illicit drugs. A deficiency of folic acid is associated with increased risk for neural tube defects such as spina bifida.

Many bacteria, viruses, and chemical substances can pass the placental barrier and harm the developing offspring. These harmful agents are called terotagens and pose a great risk during prenatal development. Alcohol use during pregnancy is associated with birth defects, mental retardation, low birth weight, and miscarriage. Smoking during pregnancy is associated with miscarriage or ectopic pregnancy, low birth weight, and infant death. Despite the risks associated with smoking, a notable percentage of women in the United States (12% in 1999) giving birth report smoking during pregnancy, with rates higher in white women than in other race and ethnic categories.

Medications, even over-the-counter substances, can cross the placental barrier and should be confirmed with a medical care provider before use. Illicit drugs, such as heroine and cocaine, are dangerous to the unborn child and can cause miscarriage, brain damage, low birth weight, and infant death, as well as life-long disabilities such as mental retardation. One caveat—while it is easy to judge the choice to use by pregnant women who smoke or abuse substances as the main problem, the underlying coping needs of such individuals may provide more enlightening answers. In short, the broader social context of these individuals may fail to support women in ways that promote healthy maternal behavior. Therefore, it is important to consider social factors that may lead women to engage in potentially destructive behaviors during pregnancy.

Breast-feeding has many health benefits for women and infants (although certain medical conditions and treatments make breast-feeding inadvisable). In women, breast-feeding reduces postpartum bleeding, facilitates the loss of pregnancy-associated weight gain, helps the uterus tighten up and return to its original size more quickly, and may reduce the risk for premenopausal ovarian and breast cancer. The release of the hormone oxytocin from nursing facilitates social and parental behavior and bonding and buffers from social stress. The infant benefits from more complete nutrients and infection-fighting agents provided in breast milk in addition to the soothing contact.

SUMMARY

Pregnancy and childbirth can be a very fulfilling development in a woman's life. Whereas not all aspects of maternal health are controllable, a woman's healthy lifestyle and a sufficient support system can help make a pregnancy more noted for the remarkable transformation of the body and psyche in realizing motherhood than for the presence of illness.

—Lori J. Lange and Gabriel J. Ybarra

See also Maternal Phenylketonuria

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MATERNAL PHENYLKETONURIA

Maternal phenylketonuria (MPKU) is an iatrogenic aspect of the dietary treatment of phenylketonuria (PKU). PKU is an autosomal-recessive inborn error of metabolism in which a person cannot metabolize phenylalanine (Phe) into tyrosine and its constituent components. Unmetabolized Phe is toxic to developing brain tissue and results in severe mental retardation. Prenatally, individuals with PKU receive normally digested nutrients through the umbilical cord; neurological damage begins postnatally when the newborn begins digesting food. Until the 1960s, the IQ of individuals with PKU was about 30, and few affected women became pregnant. Beginning at that time, national screening of newborns for PKU and treatment with a synthetic low-Phe diet prevented much neurological damage. Individuals with PKU placed on the diet shortly after birth have IQs only slightly below average in adulthood, although they are subject to attention deficit/hyperactivity disorder, learning disabilities, and frontal lobe dysfunction.

Owing to the success of identification and treatment programs, several thousand women of childbearing age in the United States alone have been treated for PKU, live essentially normal lives, and are likely to become pregnant. Initially, affected individuals stayed on the diet only until late childhood or early adolescence, after which they ate normal food, since brain development was presumably complete. However, the diet did not cure the disorder, and Phe began to accumulate in their blood.

ONSET AND CONSEQUENCES

MPKU occurs when a woman who is eating normal food or otherwise insufficiently regulated Phe becomes pregnant. The probability of the embryo itself having PKU is relatively low (about 1 in 120), but since the woman cannot metabolize Phe, toxic unmetabolized substance enters the embryo's bloodstream, generally producing massive central nervous system damage. In a collaborative MPKU study, the incidence of defects was as follows: spontaneous miscarriage in 24%, intrauterine growth retardation in 40%, microcephaly in 73%, mental retardation in 92%, and congenital heart defects in 10%. Survivors were also at high risk for growth retardation, neurological disorders, and minor craniofacial dysmorphologies. Frequency and severity of abnormalities were apparently correlated with the degree of maternal Phe levels during pregnancy. Since the adverse effects are irreversible, prognosis varies with the degree of early impairment.

The tragically paradoxical result is that the mother, whose genotype predicted an IQ of about 30, is largely spared the adverse consequences owing to a postnatal environmental influence, the low-Phe diet, whereas her offspring, whose genotype generally predicts a normal IQ, suffers major central nervous system damage owing to a prenatal environmental influence, unmetabolized Phe.

PREVENTION

Recommendation currently is for those with PKU to remain on the special diet throughout life. However, even women with PKU whose phenylalanine levels have been partially controlled during pregnancy are at risk for having offspring with serious problems. To reduce defects further, women at risk for pregnancy need to have Phe levels maintained at a low level.

Women with PKU who have been treated with the special diet should be informed of the risks of high levels of Phe to their offspring and urged to seek medical and nutritional advice before becoming pregnant. Unfortunately, prenatal control of Phe levels is difficult, and women with treated PKU are at risk for unplanned and uncontrolled pregnancy.

—Robert T. Brown

See also Maternal Health

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MATERNAL SMOKING

Maternal smoking during pregnancy is a risk to the fetus, newborn, and developing child. Between one in nine and one in six pregnant women smoke during pregnancy in the United States. Although the prevalence of women who smoke during pregnancy has declined over the past 10 years, the percentage of pregnant adolescents who smoke is actually increasing.

Compared with nonsmokers and women who quit smoking early in pregnancy, maternal tobacco use results in markedly increased maternal and fetal morbidity. A 2004 Surgeon General's report concluded that smoking during pregnancy increases many pregnancy complications (Table 1). Nicotine-mediated vasospasm of maternal placental blood vessels is a likely mechanism of some of the negative effects, along with alterations of uterine, placental, and fetal circulatory homeostasis.

Low birth weight is a leading cause of infant death, resulting in more than 300,000 deaths annually in the United States. If all pregnant women in the United States stopped smoking, there would be an estimated 11% reduction in stillbirths and a 5% reduction in newborn deaths.

Sudden infant death syndrome, childhood respiratory disease, and asthma are also associated with maternal smoking during pregnancy. There is evidence

Table 1 Summary of Pregnancy Complications Associated With Maternal Smoking During Pregnancy

Condition	*Smoker's Risk Compared With Nonsmoker or Early Pregnancy Quitter*	*Evidence for Causal Relationship*
Miscarriage	1.2 to 1.3 times	Suggestive
Ectopic ("tubal") pregnancy	1.3 to 2.5 times	Suggestive
Placenta previa (placenta covering cervix, associated with bleeding and preterm delivery)	2.5 times	Yes
Placental abruption (separation of placental from uterine wall resulting in internal hemorrhage)	1.4 to 2.4 times	Yes
Preterm rupture of membranes and preterm birth	1.6 to 2.1 times	Yes
Fetal growth restriction	~200 g less	Yes
Cleft palate	Possible association	Suggestive
Chromosomal anomalies, gastroschisis (ventral wall defects), cardiac defects, omphalocele (abdominal viscera herniated into base of umbilical cord)	No observed association with maternal smoking	Evidence inadequate to infer presence or absence of a causal effect of maternal smoking
Preeclampsia (hypertension, renal dysfunction, hematologic derangements that can result in maternal neurologic damage)	~0.5 risk for smokers (protective effect)	Suggestive

of a prenatal tobacco dose-related increase in childhood and adolescent obesity among smokers' children, even after adjusting for maternal diet, breast-feeding, maternal obesity, and socioeconomic status.

Behavioral outcomes related to maternal smoking during pregnancy include lower scores on tests of verbal skills, higher activity levels, worse performance on attention tasks, higher rates of aggression as adolescents, and a higher risk for violent crime in adulthood. Differences have been found between siblings born to the same mother who smoked while pregnant with one child and not with the other. Controversies in the behavioral research concern whether genetic vulnerability accounts for the association between prenatal maternal smoking and offspring antisocial behavior, whether maternal smoking is a marker of poor health behaviors such as alcohol consumption that, in turn, cause the behavioral effects, and whether low birth weight and other perinatal complications cause the behavioral effects. Animal research shows that prenatal nicotine alters cellular and genetic processes of early brain development, affects cognitive performance in rats in complex tasks and after pharmacological challenge, and impairs the ability of the brain to repair itself after injury.

—Colleen F. Moore and Thomas R. Moore

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MATURATION

Maturation is a biological process where developmental changes are controlled by internal (or endogenous) factors. Events that result from maturation (such as walking or secondary sex changes at puberty) are characteristic of the species and are never the result of specific practice or exercise. That is, they are not learned.

But is maturation just a process that all humans go through and one not to be used to further our understanding of individual differences? The process does seem to be very important. Waber conducted a fascinating study that examines the relationship between maturation and sex differences. Previous research had shown that males tend to score higher than females on tests of spatial abilities, while females tend to score higher on tests of verbal abilities. Waber asked the following question: Are these differences in performance the result of differences in maturation or differences in sex? She answered it by testing both early- and late-maturing males and females. She found that early maturers, regardless of sex, performed better on tests of verbal abilities, while the reverse was true of late maturers (thus confirming her hypothesis). Research such as this does not discount the importance of sex as a variable for explaining differences in performance, but it does emphasize that maturational processes have a broader influence than might have been earlier believed.

Arnold Gesell was the foremost theoretician to put forth a comprehensive theory of development based on the process of maturation. While he did believe that the environment played an important part in the developmental process, its role was one of support, not of change. According to Frances Ilg, his student and colleague, "Environmental factors support, inflect, and modify but they do not engender the basic norms and sequences of ontogenesis" (or individual development).

—Neil J. Salkind

See also Ames, Louise; Gesell, Arnold; Ilg, Frances

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MEAN LENGTH UTTERANCE

When does language begin? This question has long been debated. One of the reasons for the debate is the

question of how to measure complexity of language. Under the influence of Chomsky, the transition from single words to two-word utterances was used to mark the beginning of language. Roger Brown (1973) introduced an influential measure of syntactic development that was based on a 5-year-long study. He began this study with three children—Adam, Eve, and Sarah—in 1962 at Harvard University. Eve was observed from 18 months to 26 months, Adam was observed from 27 months to 42 months, and Sarah was observed from 27 months to 48 months. Linguistic growth of these children was assessed in terms of morphemes, that is, meaningful units of speech rather than words. Mean length utterance (MLU) is based on the average length of the first 100 utterances scored on transcripts of spontaneous speech. Length of utterance is determined by morphemes. Morphemes consist of simple-content words such as *Mummy, mouse, food, eat*; function words such as *no, yes, you, me*; and affixes such as *un-* (*un*-done) *-s* (toy*s*, ball*s*), and *-ed* (walk*ed*). Brown suggested the following rules for calculating the MLU: Researchers should only start counting morphemes on the second page of the transcript and utterances to be used had to be fully transcribed without blanks. All exact repetitions of utterances were to be counted. However, single words were to be counted only once, unless they were used to emphasize a statement, such as a child saying, "no, no, no," if they really did not want whatever was offered. Fillers such as "mm" or "oh" were not to be counted, but morphemes such as *hi* or *yeah* were to be included. Compound words such as *pussy-cat* or *choo-choo train* were to be counted as one word, as were irregular past verbs such as *went, saw,* and *did*. Diminutives such as *doggie* and *sweetie*, as well as *gonna* and *wanna*, were counted as one morpheme, but auxiliaries such as *is, have, will,* and *can* were counted as separate morphemes. All inflections such as possessive '*s*, as in "daddy'*s* car," plurals, such as *cats,* third-person singular *-s*, as in "she play*s*," and regular past *-ed*, as in "he play*ed*" were counted as separate morphemes. The ranges of utterance length were to be based on the complete transcript rather than only 100 utterances. Brown found that the growth of MLU varied for the three children he studied. He divided the major periods of a child's language growth into five stages. The first stage is when MLU is between 1.0 and 2.0, while stages 2 to 5 are marked by increments of 0.5. Hence stage II ranges from 2.0 to 2.5; stage III ranges from 2.5 to 3.0; stage IV ranges from 3.0 to 3.5; and stage V ranges from 3.5 to 4.0. Subsequently, Miller and Chapman (1981) established MLU norms based on a sample of 123 middle-class children living in Madison, Wisconsin. The age range of MLU norms have recently been extended to 13 years of age (Miller, 1991). Most of this work has been performed on English speakers, and extension into other languages may be problematic. MLU has been used as an index of grammatical development in general but has also been extended into the field of stuttering and specific language impairment as well as Down syndrome research.

—Nadja Reissland

See also Brown, Roger; Language Development

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MEDICARE

Medicare is the federal program that provides health insurance for the elderly (all adults over age 65), disabled recipients of Social Security, and people with end-stage renal disease in the United States. It was established by Congress in 1965 as Title XVIII of the Social Security Act and is the single largest source of financing for health care in the country. Medicare has contributed to improving the quality of life and increasing the life expectancy of the elderly. In combination with Social Security payments, it has effectively reduced the rate of poverty among the elderly from nearly 35% in the early 1960s to approximately 10% in 2000. As originally enacted, Medicare was a combination of compulsory hospital insurance (Part A) and voluntary insurance for outpatient care and physician services (Part B). Currently, Medicare also includes Part C (originally Medicare + Choice, now Medicare Advantage) and Part D (the outpatient prescription drug benefit, which comes into effect in 2006).

HISTORY OF MEDICARE

Medicare was conceived as the politically feasible first step toward universal, national health insurance. Although President Harry Truman proposed publicly funded, universal, national health insurance in 1945, Congress did not enact any health insurance legislation because of the opposition of the American Medical Association (AMA) and the business community. In the 1950s, Congress provided health insurance for federal employees and for dependents of members of the armed forces. In 1960, Congress enacted the Kerr-Mills Law, which provided a limited program of medical assistance to the aged. President Lyndon Johnson's landslide victory in 1964 and the simultaneous election of large Democratic majorities in both houses of Congress made Medicare's enactment possible.

COMPROMISE AND INNOVATION

Several of Medicare's features reflected the political compromises necessary to enact the original legislation. As a compromise with the AMA, the American Hospital Association, and the Blue Cross and Blue Shield health insurance plans, fiscal intermediaries and insurance carriers were assigned to administer claims and disburse federal funds to physicians, hospitals, and other eligible health professionals. The original program did not seek to control the practice of medicine, regulate hospitals, or control the costs of physician services. Instead, the program's guiding principle was to ensure that the elderly were able to receive the same standard of care as patients insured through employer-based health insurance. Two of the original features—retroactive cost-based reimbursement for hospitals and payments to physicians based on a usual, customary, and reasonable (UCR) fee—were later changed in an effort to control costs, which had risen rapidly. The 1983 Social Security amendments introduced a new Medicare reimbursement scheme by initiating prospective payment of hospitals. Under this arrangement, compensation is based on the diagnosis-related group (DRG) system, in which payment is dependent on per-case diagnosis. This prospective payment system is widely viewed as successful in moderating the growth of hospital care costs.

In 1989, Congress adopted a fee schedule to pay physicians based on a resource-based relative value scale (RBRVS). The RBRVS was implemented by the Health Care Financing Administration between 1992 and 1996 (renamed the Centers for Medicare and Medicaid Services in 2001). RBRVS became a means of implementing a standardized physician payment schedule set by the federal government in which payments are related to the resource costs needed to provide them. Payments are adjusted by region to reflect geographical differences in resource costs. The fee schedule based on the RBRVS is the mechanism used to control Medicare expenditures for physician services. The RBRVS has also decreased the gap between payments to primary care physicians and procedural specialists.

Long before Medicare pioneered techniques in cost containment, it played an important role in the civil rights movement of the 1960s by enabling the federal government to desegregate the nation's hospitals. Title VI of the Civil Rights Act of 1964 requires equal access to programs funded by the federal government. Under President Johnson's leadership, the Department of Health, Education, and Welfare applied the legislative mandate of the Civil Rights Act to the federal funds available to hospitals through the Medicare program to assure that any hospital participating in Medicare met the requirements of Title VI. Over 1,000 hospitals were desegregated between January 1966 and the implementation of Medicare on July 1, 1966. The desegregation of the nation's hospitals contrasted sharply with the slow pace of school and housing desegregation.

NATURE OF POPULATION SERVED

The nature of the Medicare population has changed since the program's implementation in 1966. In 1972, with the advent of life-saving dialysis treatment, Congress extended benefits to patients with end-stage renal disease (ESRD), regardless of age. The extension of benefits to patients with ESRD has amounted to a significant source of Medicare expenditures, particularly with the arrival of new types of treatment, such as kidney transplantation. Recent changes in demographic patterns also contribute to the changing nature of the population served by Medicare. Life expectancy is increasing. In fact, people over age 85 account for the sector of the population that is increasing the fastest. Because people over age 85 typically have more chronic medical problems and use more medical resources, changes in population structure can have a profound influence on the financial viability of Medicare. Currently, Medicare spends a major share of its expenditures on a small portion of its

beneficiaries. Five percent of Medicare beneficiaries account for 45% of total spending, while 52% of beneficiaries account for 3% of spending. Although this type of distribution is not unique to Medicare, it is aggravated by the fact that Medicare does not pay for routine physical examinations and preventive care.

SUPPLEMENTAL COVERAGE AND PRESCRIPTION DRUGS

Although Medicare is widely viewed as successful in achieving its aim of protecting the elderly and their families from the extremely high cost of medical care, it falls short of offering comprehensive coverage to its beneficiaries. To help cover the costs of Medicare's deductibles, the majority of Medicare participants also have some form of supplemental coverage, which is provided by their former employers or Medicaid or paid for out of pocket. In fact, only 13% of Medicare recipients have no supplemental coverage. While Medicare was comparable, and often superior, to private plans when it was enacted and has vastly improved the elderly's access to health care, it has not kept pace with the coverage of health insurance plans in the private sector, particularly with regard to outpatient pharmaceutical coverage.

As early as 1967, then Secretary of Health, Education, and Welfare John Gardner established the Task Force on Prescription Drugs, which recommended adding a prescription drug benefit to Medicare in its 1969 Final Report. In 1988, the first major expansion of benefits, which included the addition of a prescription drug benefit, was enacted. However, the Medicare Catastrophic Coverage Act of 1988 (MCCA) was repealed in 1989 before its implementation because it was widely unpopular with the elderly, largely because of the progressive (means-related) financing of the prescription drug benefit. Many elderly felt that this violated the program's social contract. In addition, the MCCA failed to address the issue of long-term custodial nursing home care, the leading source of catastrophic medical expenses for the elderly at that time.

Nearly 40 years after Medicare's enactment, Congress added an outpatient prescription drug benefit. The politically contentious Medicare Prescription Drug, Improvement and Modernization Act (MMA) of 2003 will pay for outpatient prescription drugs through private plans. It becomes effective in January 2006 and is currently projected to cost $530 billion over 10 years.

MANAGED CARE

As in other sectors of health care, managed care has played a role in Medicare since the mid-1980s. Medicare began risk-based contracting with health maintenance organizations (HMOs) in 1985. Many beneficiaries have chosen to enroll in Medicare HMOs to be covered for deductibles and, in many cases, to obtain coverage for outpatient prescription drugs, which were not a standard Medicare benefit at the time. It has been found that favorable selection occurred whereby younger, healthier Medicare beneficiaries were more likely to enroll in HMOs. Since Medicare's payments to HMOs were based on 95% of the average cost of a beneficiary, this favorable selection resulted in overpayments. With the Balanced Budget Act of 1997, several new alternatives were added, collectively known as Medicare + Choice, including medical savings accounts and the option of choosing a preferred provider organization. In recent years, the number of HMOs participating in Medicare has declined, while others have dropped their prescription drug benefit, causing disenrollment by dissatisfied beneficiaries. The Medicare Prescription Drug, Improvement and Modernization Act of 2003 committed $14 billion to increase payments to managed care plans. With this influx of funds, managed care plans will be paid, at least temporarily, more per enrollee than the average cost of beneficiaries in the traditional fee-for-service plan.

FUTURE ISSUES

In the future, lawmakers will have to contend with ensuring quality care in the midst of rising costs, which are related to the growing use of expensive medical technologies and the rapidly aging population. Because taxes on current workers pay for Medicare Part A, as the number of retirees and the costs of health care rapidly rise, the increasing tax burden on workers will become a pressing policy issue. Future issues include how to ensure the long-term financial viability of the program, how to cover the rising costs of hospital (Part A) and physician services (Part B), particularly in the face of expensive new methods of illness prevention and care, how to ensure that cost reduction efforts do not result in decreased access to care, and who should pay for long-term custodial care. For the nation's most popular social program, these cost and quality issues pose serious challenges for policymakers.

—Susan Canny and Philip R. Lee

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MEMORY FAILURE

It has long been held that a person's memory gradually deteriorates across the life span. This conclusion has been based on research demonstrating that memory performance gradually decreases as people get older and that self-reports sometimes have shown that memory fails more often for older people than for younger people. There is no doubt that physiological changes across the life span affect the likelihood of memory failure. However, when observations of memory failure or reports of memory are made, a somewhat different picture of the influence of aging on memory emerges.

Research on memory in early childhood reveals that even very young children are clearly capable of remembering events; however, the likelihood of successful future recall for early life events (e.g., those occurring prior to age 3 or 4) is minimal, a phenomenon known as "childhood amnesia." Additionally, research on eyewitness testimony suggests that children under the age of 6 are vulnerable to distortions in recall following exposure to misleading information. Consistent with the results for performance, self-reports demonstrate that memory failures decrease from childhood to adolescence and from adolescence to young adulthood. Similarly, increased age between young adults and middle-aged adults also corresponds with decreases in the frequency of observed failures (although periods of intense job and family responsibilities in middle age may produce a temporary increase in such failures). Alternatively, recent research has found that older adults recall having experienced fewer memory failures than middle-aged adults.

Overall, it appears that the frequency with which memory fails gradually decreases across the life span in healthy older people (excluding those with dementia or other memory disorders). In childhood as well as adulthood, these decreases appear to be due to maturation and learning. As children develop their language skills and knowledge base, they are better able to understand life experience in ways that lead to less memory failure. As people age, they acquire more effective strategies for learning and retrieval. Although older people report more difficulty learning novel tasks, as well as less confidence in their memory abilities, they also report having everyday memory failures less frequently than are reported by younger people.

Several reasons may be offered for why older adults may report fewer memory failures than younger adults. Older individuals may report fewer memory failures because they are often retired and have a less demanding lifestyle. In addition, there is evidence that older people make more use of external memory aids (e.g., notepads and planners) than younger people. Also, older people value and often remember prospective memory tasks more than younger people. It could be argued that older people may simply forget more of their memory failures than do younger people. However, older people do not report fewer memory failures for all memory asks. For example, older adults report forgetting to turn off the stove more often than younger adults. Nevertheless, it can no longer be assumed that healthy older people have poorer memories than younger people.

—Douglas Herrmann, Elizabeth O'Laughlin, and Kymberley Bennett

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MENARCHE

Menarche is defined as the onset of menstruation and signifies that the body is readying for reproduction. Menarche is a significant event for the adolescent girl that affects both the body and the identity. From a physiological standpoint, menarche is a visible sign of puberty. At approximately age 8 to 10 years, changes in the reproductive system begin with the release of ovarian estrogen and pituitary gonadotropins. This causes growth in the reproductive organs and secondary sex characteristics to appear. Concurrently, a growth spurt occurs, accounting for 20% to 25% of the adolescent's final height and 50% of ideal body weight. In addition, the external signs of physical maturation in adolescent girls follow a pattern. Breast budding is first, followed within a few months by pubic hair growth, and then changes in body shape. Axillary hair and activation of axillary sweat glands begin later. Internal changes at this time include uterine and vaginal growth, a more acidic vaginal pH, and an increase in vaginal secretions. Ovarian estrogen production increases, and the pituitary assumes a cyclic rhythm. At this point, late in puberty, menarche occurs. Ovulation does not always occur early on in the menstrual life cycle. Only 23% of females ovulate in the first year after menarche.

The average age of menarche in 1840 was 16.5 and is presently 12.8 years. In developing countries, the age at which menarche occurs has decreased by almost 4 years over the past 150 years. However, it appears as though this trend has ended and the age of menarche has reached a plateau. The decrease in the age of menarche may be due to improvement in socioeconomic conditions, effective public health measures, and nutrition. The timing of puberty, and therefore menarche, is affected by many factors, including genetic and biological influences, stress, socioeconomic status, health, and environmental factors. There is a familial pattern with menarche. It is not uncommon for a girl to reach menarche about the same age as her mother or sisters. Environmental factors, such as exercise, nutrition, and weight, also affect the timing of menarche. Initiation of menses depends on attainment of a critical body weight and fat. Obesity is a factor contributing to an earlier menarche. Another contributing factor to the age of menarche is ethnicity. Menarche occurs 8 months earlier in African American girls than in white girls.

At menarche, adolescent girls are prone to certain menstrual disorders, including irregularity and dysmenorrhea. Menstrual irregularity is common for the first 18 months after menarche. Dysmenorrhea is experienced by 50% of adolescents and decreases in early adulthood. Ten percent of adolescent girls are incapacitated for 1 to 3 days a month.

Psychological implications of menarche are also important. Menarche is an event that contributes to the meaning of a personal and sexual identity. Societal attitudes affect the meaning of menarche. Some cultures have taboos, where menstruating females are not permitted to perform certain tasks or be with males. Societal attitudes toward menarche in the United States are primarily negative, including the belief that menses is offensive and associated with dirtiness and odor. These negative attitudes affect girls at a time when they are at great risk for identity and self-esteem problems and can lead to anxiety about menarche. At this time, girls often feel an increasing closeness and dependence on their mothers and a distancing from their fathers. In addition, postmenarcheal girls often view themselves as more sexually differentiated than premenarcheal girls. Self-portraits of premenarcheal girls are often androgynous, while self-portraits of postmenarcheal girls contain more adult clothing, jewelry, breasts, hips, and a waist. Parents, too, often view their daughters differently, allowing them more freedom, such as wearing makeup, dating, and later bedtimes and curfews.

Research studies on menarcheal preparation demonstrated that many girls were not adequately prepared for menarche and experienced fear, anxiety, and ambivalence. Studies showed that preparation through menstrual education assisted in allaying negative perceptions. In addition, most research showed that girls remember their first menstruation as an emotionally important event that elicits both excitement and fear.

—Melanie Kalman

See also Menstruation

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MENOPAUSE

The point in a woman's life when she stops experiencing monthly menses (periods) for an entire year is defined as menopause. It marks the final chapter in a woman's reproductive cycle and an end to her fertility. Menopause occurs as the woman's ovaries slow in their production of estrogen and eventually stop releasing eggs. In most women, this is a gradual process that develops over several years. The average age for achieving menopause is 51 years.

The time during which a woman begins to experience the transition into menopause is called perimenopause. For most women, perimenopausal symptoms start around age 45. This period of fluctuating hormones may have implications for the woman physically and emotionally. Some women look forward to this time when they can look back at monthly bleeding and concerns over pregnancy with newfound freedom. Others express anxiety and discomfort as the changes of perimenopause impact their feelings of youthfulness and overall health.

The cessation of menstruation caused by the surgical removal of the ovaries and uterus or chemotherapy or radiation treatments is known as induced menopause. This experience differs from natural menopause in that it is an abrupt rather than gradual change.

A woman who has achieved menopause is considered postmenopausal. It is essential that she continue to monitor her health through yearly breast and pelvic examinations, Papanicolaou (Pap) smears, and general health screenings, such as bone density tests and colonoscopy.

A changing menstrual pattern is often the first indication a woman may have that she is perimenopausal. The cycle typically becomes irregular with skipped or missed periods, but may also manifest more frequent, heavier bleeding. It is important to provide contraceptive counseling to perimenopausal women, because until menopause is achieved, fertility and pregnancy are a possibility. Hormonal contraception during this period may also help offset some of the physical discomforts that are frequently experienced during this phase.

In addition to changing bleeding patterns, the majority of perimenopausal women experience some combination of the following symptoms: hot flashes, increased sweating, frequent urination, headaches, vaginal dryness, decreased libido, insomnia, forgetfulness, and mood swings. Perimenopausal women are often also dealing with midlife events that can exacerbate these symptoms.

Hormonal and nonhormonal treatments are available for reducing the symptoms of menopause. Nonhormonal options are varied and may be specific to certain categories of symptoms. For example, although a diet that is rich in vegetables and fruit and minimizes saturated fats is best for overall health, avoiding caffeine and alcoholic beverages and increasing soy foods may actually decrease the number and severity of hot flashes and night sweats. Weight-bearing and aerobic exercise is recommended to help maintain bone density and cardiac function. Kegel exercises, the tightening and relaxing of the vaginal muscles, increases blood flow, increases lubrication, helps maintain bladder control, and may enhance orgasm.

Menopausal women have employed alternative medicine options such as homeopathy and acupuncture, as well as use of herbal supplements, for successful relief of bothersome symptoms.

Hormonal treatments have been a popular choice but do have some associated risks. These options must be tailored to each woman's needs keeping under consideration her relevant health history to maintain risks at a minimum.

Vaginal creams are used by many women to reduce vaginal dryness and enhance sexual function. Nonprescription lubricants and vaginal moisturizers are also available.

Systemic hormonal therapy benefits women by eliminating hot flashes, reducing vaginal dryness caused by thinning vaginal tissue, decreasing insomnia, and possibly improving mood and energy levels. However, these therapies may carry added risks for some women that may outweigh the benefits. These may include an increased risk for breast and uterine cancer, heart disease, blood clots, and gallbladder disease.

In general, the perimenopausal period of a woman's life brings with it many changes—some welcomed, some not. However, the achievement of menopause, a milestone in female development, may be associated with feelings of freedom, relaxation, and overall well-being.

—Christina M. Kocis

See also Hormone Replacement Therapy, Hot Flashes, Ovulation

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MENSTRUATION

Menstruation is a phase in the female reproductive or menstrual cycle. This monthly cycle involves the release of an ovum, or egg, from the ovary as well as the thickening and shedding of the endometrium, the outer layer of the uterus. Hormones released from the hypothalamus, pituitary glands, and ovaries regulate the menstrual cycle. Each month an ovum matures in one of the ovaries. In the middle of the 28-day cycle, the mature ovum is released from the ovary into one of the fallopian tubes. This is referred to as ovulation. The ovum travels down the fallopian tube and into the uterus. If a sperm fertilizes the ovum, it is implanted in and nourished by the tissues in the endometrial lining. If fertilization does not occur, the lining is shed through the vagina. This shedding is referred to as menstruation. This outer layer, which consists of a small amount of blood (2 to 5 ounces per month), detaches from the uterine wall and leaves the body, along with other cervical and vaginal secretions, through the vagina. Menstruation is also referred to as having a period, the menstrual flow, menses, or bleeding. Most women menstruate for approximately 3 to 7 days.

Girls experience their first menstruation or menarche around the age of 12 or 13. Menarche occurs within the broader context of puberty and is actually one of the last physical changes that girls experience. The first period, a major developmental milestone, is a sudden and often dramatic event that signals movement from childhood to adulthood. After menarche, girls may experience changes in their identity, body image, and self-esteem. Their new sexual maturity may also influence their social and family status. Many girls report feeling both excited about the onset of menstruation as well as scared or ashamed. Girls who are prepared ahead of time for this major change have more positive experiences and attitudes than those who are unprepared.

Many people share negative attitudes toward menstruation and view menstruation as an unsuitable topic of discussion. Often referred to as "the curse," menstruation is associated with sickness, debilitation, instability, and pain. This taboo status perpetuates negative attitudes and myths and may cause girls and women to feel embarrassed and ashamed about menstruation. They may avoid certain activities during menses and conceal their menstrual status from others. When asked about positive aspects of menstruation, however, women report that they regard regular menstruation as a sign of good health and an indicator of their fertility status.

Some women experience physical changes, referred to as symptoms, just prior to and during menstruation. These include breast tenderness, bloating, and cramping. For the majority of women, these symptoms do not interfere with daily functioning. However, some women experience disorders such as dysmenorrhea, or the experience of extremely painful cramping during menstruation, that may interrupt their functioning. Some women report psychological symptoms prior to menstruation, such as irritability, depression, anxiety, and moodiness. This collection of symptoms is commonly known as premenstrual syndrome (PMS), although the validity of this "disorder" has been debated. A more severe form of PMS, which is known as premenstrual dysphoric disorder (PMDD), is an official psychiatric diagnosis. However, the prevalence rate for this disorder is quite low.

Most women experience menstruation for four decades. Climacteric, or the gradual cessation of

regular menstrual cycles, takes place over the course of approximately 5 to 7 years. When a woman has experienced the absence of menstrual cycles for 12 months, she has reached menopause. This typically occurs around the age of 51 years.

—Ingrid Johnston-Robledo

See also Menarche

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MENTAL AGE

Mental age is an assessment of performance based on the behavior typical for an age group. For example, a mental age of 7 years indicates that the subject's performance is that of a typical 7-year-old child. Mental age itself does not take into account the subject's actual chronological age. Mental age divided by chronological age times 100 (to eliminate decimal places) is the generic formula for calculating IQ (the intelligence quotient). The concept of mental age was first introduced as mental level in the Binet-Simon Scale of 1908. Binet's goal was to identify the academic skills typical of specific age groups. Binet did not assume that there was one general intelligence underlying different academic areas such as language and math. Binet also did not assume that a hereditary component determined mental age. Early in the 20th century, the theoretical construct of mental age was transformed by research supporting Charles Spearman's theory of a general intelligence factor underlying IQ and of a hereditary component. It was William Stern, in 1912, who first divided mental age by chronological age to take into account the actual age of the child. In 1916, Lewis Terman multiplied the intelligence quotient by 100 to get rid of the decimal places. Terman's formula for calculating the intelligence quotient became popularized as the formula for measuring IQ. Using Terman's formula, a child with the same mental age and chronological age would have an IQ of 100. Research has shown that IQ tests measure the rate of academic learning for most children by 7 years of age. The average child at age 7 years would have a mental age of 7, and continuing to learn at an average rate, would have a mental age of 8 at 8 years of age, and so forth. Contemporary IQ tests use cumulative indexes to determine scores, rather then using Terman's formula to calculate each individual IQ score. Adult intelligence does not change from year to year, so mental age has much less meaning when discussing adult intelligence. The contemporary equivalent of mental age is the standard age score on the Stanford-Binet IQ tests (1987).

—Francine C. Smolucha

See also Chronological Age

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MENTAL RETARDATION

Mental retardation refers to a state of functioning, a person's capacity for functioning in various environments. Although people with mental retardation have historically had limitations in life options due to societal attitudes, the view toward the possibilities and accomplishments of people with mental retardation is changing. People with mental retardation are a heterogeneous population with diverse personalities, interests, and abilities who can achieve given the appropriate supports.

TERMINOLOGY

As the field and study of mental retardation evolve, so does the terminology used to discuss the disability. Over the course of the past century, various terms

have been utilized to characterize or label this disability. With time each term has begun to carry stigmata, and in an effort to reduce negative consequences, new terms have been periodically adopted. There is concern over the current use of the term mental retardation because it often becomes a global descriptor of a person that focuses on the deficits in functioning rather than abilities and strengths. Although there is general agreement that the term mental retardation carries stigma, there is no consensus from the field as to an appropriate term to replace the current label of mental retardation. Given this lack of acceptance of a single term, various terms, including mental retardation, intellectual disability, and developmental disability, are being used by organizations and advocates. The field continues to seek a common term that references this disability, reflects the current definition, and diminishes the associated stigma of the disability. For the purposes of this discussion, the term mental retardation will be used.

DEFINITION OF MENTAL RETARDATION

The basic definition for mental retardation includes three components: (a) subaverage intellectual functioning, (b) significant limitations in adaptive behavior skills, and (c) manifestation during the developmental period. Although the definition of mental retardation has continually undergone revision, previous definitions include references to the above components. The organization leading the field in establishing, defining, and classifying the condition of mental retardation is the American Association on Mental Retardation (AAMR). The above components reflect the AAMR definition as well as the definition of other prominent organizations (e.g., American Psychiatric Association, World Health Organization).

ASSESSMENT AND DIAGNOSIS

Determining if an individual has mental retardation involves utilizing assessment instruments to establish if the individual meets the criteria of the mental retardation definition. That is, a person's intellectual functioning and adaptive behavior have to be assessed to determine if that person has the deficits that are associated with mental retardation. Also, it has to be established that these deficits were evident during the developmental period.

Assessing Intellectual Functioning

Intelligence is one's mental capacity for reasoning, solving problems, thinking, abstracting, learning from experience, and generalizing knowledge across settings. Mental retardation refers to subaverage intelligence as a measured intelligence quotient (IQ) of two standard deviations below the mean. The mean or average score for an IQ test is 100, and standard deviations are 15-point increments. Thus, subaverage intelligence is typically considered an IQ of 70 or below. Assessment of IQ involves administration of IQ and other assessment instruments by professionals trained in psychological evaluation. The most commonly used instruments for assessing intelligence are the Weschler Intelligence Scales for Children-III, the Weschler Adult Intelligence Scale-III, the Stanford-Binet-IV, and the Kaufman Assessment Battery for Children.

Individuals with subaverage intellectual functioning typically display deficits in memory and generalization, as well as decreased motivation. Memory deficits often center on problems with recall and strategies for remembering. Generalization difficulties involve problems with transferring and applying knowledge across environments. Due to repeated failures and excessive help received from service providers and caregivers, individuals with mental retardation often learn helplessness and have decreased motivation.

Assessing Adaptive Behavior

Deficits in intellectual functioning may cause difficulty in acquiring and utilizing adaptive behavior skills. Adaptive behavior refers to skills necessary for daily life functioning in home, school, work, and community environments. Adaptive behavior includes skills across three domains: conceptual (i.e., language, academic, community, self-sufficiency), social (i.e., social interaction, communication), and practical (i.e., daily living/home living, self-help). Limitations are typically considered performance at least two standard deviations below the mean on either (a) one or more domains of adaptive behavior (conceptual, social, or practical); (b) an overall combined score across the domains of conceptual, social, and practical skills; or (c) two or more skills from any domain (e.g., communication and self-help). Various adaptive behavior scales are available to assess and identify areas of needs. Since assessing adaptive behavior

involves knowing about a person's daily life skills, those who know the individual with disabilities (e.g., parent, teacher) should complete the scales. Some of the more widely used adaptive behavior scales include Vineland Adaptive Behavior Scales, AAMR Adaptive Behavior Scales, and Scales of Independent Behavior.

Determining Developmental Period

The final criterion for diagnosis is the requirement of manifestation of the disability during the developmental period. The developmental period typically refers to the time from conception up to the age of 18. Thus, as part of the definition, the documented age of onset for mental retardation must be prior to the age of 18.

CLASSIFICATION SYSTEMS

The definition of mental retardation and corresponding assessment information allows one to determine who has mental retardation, but it does not provide insight into what needs these individuals might have. To determine what services and supports these individuals might need, various classification systems have been adopted and revised. These classification systems assist organizations and service systems in meeting the needs of individuals with mental retardation.

Using Categories to Determine Services and Supports

In the past, the primary means of classifying people with mental retardation was to categorize by IQ level. These categories were then used to determine eligibility for assistance and to design programs in health, education, social, vocational, and economic areas. (See Table 1.)

One negative aspect of these categories is the tendency for service systems to view individuals with mental retardation solely by their IQ and level of retardation rather than view them as individuals with unique needs. Thus, when these categories are used, individuals are often grouped together into preexisting services based on their label instead of services and supports being designed to meet specific needs of individuals. Nevertheless, various service systems continue to utilize these categories due to the ease in determining eligibility and in providing services based on this system. Even though use of this classification system persists, the trend in the field of mental retardation is toward a more holistic approach in eligibility and needs determination. The shift is toward viewing each person with mental retardation as an individual with specific needs and characteristics that form a foundation for determining supports.

Table 1 Categorization of Mental Retardation by IQ Level

Category of Mental Retardation	*IQ Range*
Mild mental retardation	50–55 to 70
Moderate mental retardation	35–40 to 50–55
Severe mental retardation	20–25 to 35–40
Profound mental retardation	Below 20 or 25

Using Support Needs to Determine Services and Supports

Support needs are an alternative to using categories of mental retardation as a basis for designing and providing services. Supports are resources and strategies for promoting quality of life and individual functioning. Consideration of support needs is strongly encouraged by various mental retardation advocacy organizations in the application of the mental retardation definition. Under this approach, individuals with mental retardation are evaluated to determine supports needed to function across various environments. Those resulting support needs form the starting point for planning and implementing services. Whether supports are natural or service based, they expand life possibilities by meeting needs that allow individuals to perform in a broader range of normal environments.

Individuals with mental retardation may need support across any or all of the following areas: teaching and education, human development, home living, community living, employment, health and safety, behavioral, social, and protection and advocacy. The intensity of support needed in each area is dependent on the characteristics of the individual and may vary across support areas. (See Table 2.)

With the appropriate supports provided with the needed intensity, individuals with mental retardation can be active and productive members of society. Supports create opportunities for persons with mental retardation to achieve success, make contributions, and experience inclusion.

Table 2 Types of Support Needs

Support Intensity	*Description*	*Example*
Intermittent	Provided on an as-needed basis; typically short term	Need assistance locating place of living and securing a checking account
Limited	Consistent monitoring of support needs; support is time limited	Need support budgeting money, shopping for groceries, and planning meals
Extensive	Regular involvement across several environments; typically daily	Need support from staff to complete shopping and prepare meals
Pervasive	Constant, high-intensity support across environments; often life sustaining; requires more staff and more intrusive support	Assistance with self-care needs such as eating and toileting

CAUSES

Understanding mental retardation leads one to question how often and why this disability occurs. Mental retardation occurs in 1% to 3% of the general population. Causal factors are typically classified as either biomedical, social, behavioral, or educational. Causal factors, when known, can provide useful information for family and service providers ranging from medical or health risks associated with a disorder to specific genetic information related to the heredity of a disorder.

Although specific risk factors vary for each individual and the cause is typically more complicated than a single causal factor, certain factors are more readily associated with specific levels of mental retardation. The suspected cause in most cases of milder mental retardation is an interaction of social (e.g., poverty, inadequate health care pre- and postnatally), behavioral (e.g., drug and alcohol use, abuse and neglect), and educational (e.g., parental mental retardation, lack of stimulation) factors. For individuals with more severe levels of mental retardation, the primary causal factor is biomedical (e.g., chromosomal disorders, maternal illness, premature birth, degenerative disorders), although secondary causal factors often coexist.

Understanding the causes of mental retardation builds a basis for developing strategies for prevention. Current prevention efforts target various risk factors through support programs (e.g., genetic counseling, alcoholism treatment, early educational intervention). A better understanding of the dynamics between causes and prevention is sought so that greater success in prevention may be achieved.

—Amy Childre

See also Down Syndrome

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MENTOR

The term mentor is one with a long history. As related in Homer's Odyssey, Mentor was the noble friend whom Odysseus (known as Ulysses by the Romans) asked to protect his household (including his wife) and to educate and care for his son (Telemachus). Athena, goddess of

war and wisdom, took the form of Mentor on occasion to give wise and useful advice to both Odysseus and his son—advice that would most likely have been rejected had Athena appeared in her true female form. Thus, the term mentor comes to us from an oral saga first told hundreds of years B.C.E. and encompassing behaviors of nurturance, counseling, and support.

Mentors and their protégés typically form a one-to-one relationship in which the mentor, older or more experienced than the protégé, facilitates upward mobility and provides advice, protection, and guidance. Mentors typically provide three types of support to their protégés. Vocational support enhances the career of the protégé by providing advice, sponsorship, or protection. Psychosocial support facilitates the social-emotional stability of the protégé by providing friendship, acceptance, and reassurance. Role modeling promotes growth of the protégé by demonstrating appropriate behavior.

Since the 1980s, many businesses, schools, and nonprofit organizations have instituted mentoring programs to facilitate retention and development of employees, students, and trainees. At the same time, researchers have assessed both formal and informal mentoring relationships to determine the benefits of being mentored and the conditions under which these benefits are most likely to accrue.

Mentoring has been found to have a positive effect on performance, employee retention, income, and career development. While it has been found that a formal mentoring program is more effective than no mentoring, there is evidence that in most instances, informal mentoring programs in which the protégé has the opportunity to choose his or her own mentor produce stronger results. Informal mentoring often results in long-term relationships, greater retention in the profession, more promotions, and higher salaries in the protégé's future career.

Benefits for the protégé are closely related to the quality of the relationship and the interaction between the mentor and protégé. The protégé may feel threatened in accepting guidance and advice, particularly in a formal mentoring program. For example, in a mentoring program for beginning teachers, the less new teachers perceived that their mentors respected their ideas and style of teaching, the less they perceived they could learn from their mentors, and the less satisfied they were with the mentoring program. However, new teachers who had the opportunity to equalize their relationships by helping their mentors expressed more satisfaction with the mentoring program and more likelihood of remaining in their professions than did those who were not able to establish this equality of relationship.

A formal mentoring program often requires mentors and protégés to be matched by some specific, objective criteria, such as field of training or department of employment. Such criteria may also play a role in an informal mentoring match-up, but most often it is "chemistry" that is the deciding factor. Similarities in such intangible areas as working style, interests, and personality have been found to increase effectiveness of the mentoring relationship even in formal mentoring programs, where this type of "chemistry" happens only accidentally.

Advantages of both formal and informal mentoring programs exist for the mentor as well as for the protégé, potentially helping reduce midcareer burnout. Teachers, for example, who have served as mentors report greater use of their experience, improved skills, and increased satisfaction with their profession. Middle age, according to Erik Erikson's theories of adult development, is often a time in which one feels a need to reassess one's life and contribute to future generations. Mentoring can satisfy this need.

—Claire J. Owen and Linda Z. Solomon

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META-ANALYSIS

When attempting to make a decision based on research studies, it is often necessary to compare, contrast, and combine the results from several studies into one general finding. However, this may prove difficult depending on how similar the studies are and how many studies have been performed. There have been hundreds of research studies conducted examining the

effects of day care on children, the best ways to teach reading, and so on, and new reports are being published daily. How can a person read all of these? How is a reader supposed to come to a supported conclusion?

The approach to research integration called meta-analysis is the application of data analysis to quantitative summaries of independent studies. By recording the properties of studies and their findings in quantitative terms, the meta-analysis of research permits the use of statistical approaches.

Researchers have traditionally drawn conclusions about the extent to which research applies to others by conducting literature reviews. A researcher would read all of the relevant published reports and produce a narrative describing his or her evaluation of the studies and overall set of conclusions. Narrative reviews are useful because they organize many studies on a topic. However, the conclusions are based on the subjective impressions of the reviewer.

During the 1970s and 1980s, the use of meta-analysis techniques became a more accepted and popular approach for combining and integrating the results of research studies. Meta-analysis was an attempt to address a number of issues. One was the rapidly growing number of studies available to be reviewed. Another was the recognition that not all research studies provide equally good data.

In a meta-analysis the researcher combines the actual results of a number of studies. The analysis consists of a set of statistical procedures that uses effect sizes to compare a given finding across many different studies. *Effect size* is a general term that refers to the strength of association between two variables.

The main point of emphasis in meta-analysis is obtaining conclusions based on mathematical synthesis of research studies. Instead of developing a narrative report that describes general findings, meta-analysis techniques calculate a measure of effect size. For example, suppose there are three research studies examining the effect of program A on improving reading scores using a computer game. Two of the studies found that the computer game increased reading scores by 7 and 5 points, respectively, whereas the other study found no improvement. In a meta-analysis, the results from the three studies would be averaged to calculate a measure of effect size. The best estimate of program effectiveness would be 4 points.

Meta-analysis results are often reported in terms of effect sizes. Some typical estimates used are the correlation coefficient (r) and Cohen's d. The effect sizes are often weighted to place more emphasis on studies utilizing more participants. This produces more reliable results. Typically you are seeking reviews that have utilized a weighted average and have included a large number of studies.

There are two important advantages of the mathematical estimate of effect size over the narrative report. First, the statistical analysis takes into account the sample size of each study, includes more studies, and is more reliable. The second advantage is that meta-analysis results typically synthesize the results of studies conducted by independent researchers. Since these researchers are not working together, if one researcher makes a systematic error, the effects of these studies will have less of an impact on the overall result when they are averaged with the results from other independent researchers.

The disadvantages of meta-analyses center primarily around the quality of the studies included. If studies of poor quality are included, then the results are affected. Another difficulty for meta-analysis comes from publication bias. Many studies that fail to find significant differences or relationships are not published. This "file drawer" problem can lead to an inaccurate estimate of the actual relationship between two variables.

—Stephen Burgess

See also Statistical Significance

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METACOGNITION

Cognition refers to the mental processes involved in acquiring and using knowledge. We usually think of knowledge as being about things external to ourselves, but we can also acquire and use knowledge about cognition itself. In addition to all the other things that children come to know about as they mature, they

also learn about how the human mind works. This "cognition about cognition" is known as metacognition.

Psychologists who study the development of metacognition try to understand how and when children acquire knowledge about cognition and how they use this knowledge in cognitive activities such as learning, memory, reading, and problem solving. Research in cognitive, educational, and developmental psychology has revealed that metacognition plays a crucial role in these important areas of development.

John Flavell pioneered the study of metacognition with his work on children's developing knowledge about memory, or metamemory. Flavell recognized that one important factor in children's memory development is their growing knowledge about how memory works. Flavell's early research revealed that, although younger children have some understanding of memory, they have less accurate knowledge about their own memories and about human memory in general than do older children. For example, most kindergarten children know that a long list of items is more difficult to remember than a short list, but they often dramatically overestimate the number of items they can remember. By the end of elementary school, children have a fairly solid understanding of the factors that influence remembering and forgetting and a more realistic picture of the inherent limitations of human memory.

Following this early work on metamemory, researchers extended their study of metacognition to other domains and included adolescents and adults in their investigations. Deanna Kuhn has shown that metacognition plays a central role in scientific reasoning. According to Kuhn, the essence of scientific reasoning is the evaluation of alternative theories in terms of available evidence. Scientists must actively construct mental representations of scientific theories and monitor, regulate, and critically evaluate their thinking about them. Kuhn has shown that this kind of metacognition can be quite difficult even for adults, but educational experiences that emphasize critical thinking can promote the development of scientific reasoning.

In another important area of development, research on reading has demonstrated that good readers display a host of metacognitive skills, and it is largely these skills that distinguish good readers from poor readers. As one example, good readers actively monitor their comprehension, recognize when they have failed to understand a passage, and reread accordingly. Poor readers, in contrast, fail to monitor their comprehension and consequently often do not understand or remember what they have read.

As research has yielded increasing knowledge about metacognition, intervention programs based on this research have been designed with the goal of improving academic performance. One such program, developed by Annemarie Palincsar and Ann Brown, uses the technique of reciprocal instruction. A teacher and a few students take turns engaging aloud in the kinds of metacognitive skills that are associated with effective reading comprehension, such as identifying important themes, summarizing a passage in one's own words, and asking key questions. This is one example of how basic research on metacognition has been translated into educational practices that appear to produce lasting improvements in essential academic skills.

From a historical perspective, developmental research on metacognition can be seen as one of the earliest manifestations of renewed interest in the human capacity for self-reflection, a subject that was actively ignored in mainstream psychology for much of the 20th century. The pervasive influence of this general theme is evident in numerous entries in this encyclopedia (e.g., emotional intelligence, self-efficacy, theory of mind, wisdom), in addition to this one.

—David Estes

See also Cognitive Development

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METHADONE

Methadone is a synthetic substance that has effects in human beings similar to opiates such as morphine and heroin. Methadone is widely used medicinally in the treatment of opiate addiction, but is also used in the

management of pain. Opiate addiction is a serious condition in which individuals need to take a drug such as heroin regularly because they feel a strong compulsion to do so and they experience withdrawal symptoms when they cease taking the drug. The compulsion is so strong to use the drug that these people typically take more of the drug than they intend to and continue taking it despite the fact that it is causing them harm. Opiate addiction is a serious medical and social problem. It is associated with high rates of crime and mortality due to a number of causes, including opiate overdose and human immunodeficiency virus (HIV) and viral hepatitis infection.

As early as 1949, methadone was identified as a useful agent for detoxifying people addicted to opiates, and it is still used for this purpose. Detoxification involves administering diminishing doses of methadone until the person no longer experiences any withdrawal symptoms. However, because detoxification is not an effective treatment for opiate addiction, methadone is more commonly employed as a maintenance treatment. In maintenance treatment, a stable dose of methadone is administered on a daily basis.

Vincent Dole and Marie Nyswander developed methadone maintenance treatment in the early 1960s in New York City. A number of features associated with methadone make it particularly suitable for use in maintenance treatment. Methadone is easily absorbed from the gut and so can be taken orally. Once absorbed via the gut, methadone has a long duration of effect, allowing it to be administered once a day. By contrast, heroin needs to be taken three or more times a day. Oral administration obviates the need for injection, thereby reducing the risk for HIV and viral hepatitis infection through the sharing of needles. Oral administration also results in slower absorption, which means that rapid intoxication is avoided. Once patients are stabilized on an adequate dose of methadone, they experience no withdrawal symptoms or craving to use heroin and, if they do use heroin, its effect is attenuated.

After Dole and Nyswander published a series of studies showing the effectiveness of methadone maintenance treatment, it was adopted widely in the United States and soon spread, and it is now the most commonly used treatment for opiate addiction throughout the world. A large number of studies have shown that methadone maintenance reduces opiate use and overdose, crime, and the risk for HIV infection.

The studies conducted so far also show that there are four important ingredients in methadone maintenance treatment. The first ingredient is methadone. Treatment approaches that have attempted to replace methadone with intensive counseling and welfare services are not effective. The second ingredient is the dose of methadone. Treatment programs that individualize the dose of methadone to meet the needs of patients are more effective than programs that restrict dosing to lower levels. In general terms, higher doses of methadone (greater than 60 mg per day) tend to be more effective than lower doses (less than 40 mg per day). The third ingredient is the length of time that the treatment is offered; long- rather than short-term courses of treatment are more effective. The fourth ingredient is the provision of medical, counseling, and other social welfare services. Programs that provide for patients' medical, social, and psychological needs are more effective. However, programs that simply provide methadone without these ancillary services are still effective to some extent.

—Jeff Ward

See also Addiction, Drug Abuse

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METHYLMERCURY

Methylmercury is a chemical present in virtually all aquatic ecosystems in some concentrations. The substance was discovered to be a teratogen at Minamata, Japan, in the 1950s. A high rate of cerebral palsy and mental retardation occurred in children whose mothers ate contaminated seafood while they were pregnant. In Iraq, in 1971 a poisoning incident occurred in which people ate seed grain that had been treated with methylmercury as a fungicide. Iraqi and U.S. researchers together studied the children of women who had eaten the methylmercury-treated grain while pregnant.

Prenatal methylmercury exposure was estimated by taking hair samples from the women. A dose-response relation was found between exposure and delay in reaching developmental milestones such as walking, talking, and independent toileting.

After the discovery at Minamata and in Iraq that methylmercury could be a potent neurodevelopmental teratogen, research began on effects of exposure to lower concentrations of methylmercury. At present, human exposure to methylmercury is primarily from consumption of fish and seafood, both commercial and sport caught. Several longitudinal prospective studies have examined the effects of prenatal exposure to methylmercury in fish on children's later cognitive and behavioral functioning. In the Faroe Islands, which are located in the north Atlantic and are part of the Kingdom of Denmark, higher prenatal mercury exposure was related to lower scores on tests of verbal functioning, motor performance, and attention at 7 years of age. There is also some evidence in the Faroes that higher mercury exposure (both pre- and postnatal) is associated with lower heart rate variability and increased latency of brain stem auditory evoked potentials. Heart rate variability is an indicator of the balance of the parasympathetic and sympathetic nervous systems and is also linked to attention.

Controversy over the effects of methylmercury exposure from fish and seafood exists because not all longitudinal studies have shown adverse effects. A study in the Republic of Seychelles, an island nation off the coast of Africa, showed no adverse effects of prenatal methylmercury from fish on children's cognitive functioning. However, another study of contemporaneous, as opposed to prenatal, mercury exposure has shown adverse effects on children's visual contrast sensitivity. In children in Amazon regions where mercury is used in gold mining, motor performance (finger tapping) and memory were negatively related to higher contemporaneous mercury exposure. In adults, color sensitivity, contrast sensitivity, and peripheral vision were all negatively related to contemporaneous mercury exposure.

A panel of the National Academy of Sciences used results from both the Faroe Islands and Seychelles studies and concluded that there was sufficient scientific support for the U.S. Environmental Protection Agency's recommendation that children and women of childbearing age limit exposure to methylmercury in fish to 42 μg per week. This implies that a 130-pound woman should not eat more than one 8-ounce tuna sandwich per week.

Methylmercury biomagnifies up the food chain such that a predator will have a higher concentration than its prey. The longer the food chain, or the more trophic levels, the higher the concentration of methylmercury at the top. Consequently, large predator fish have a higher concentration of methylmercury than fish that feed lower on the food chain. In many areas of the United States and Canada, fish are deemed unfit for human consumption because of contamination with methylmercury. Fish consumption warnings for children and women of childbearing age issued by government agencies recommend that many popular species of sport fish be consumed no more than once a month. The latest national health survey shows a strong relationship between the number of fish meals eaten in the past month and mercury concentration in blood.

—Colleen F. Moore

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MIDDLE ADULTHOOD

Human development is studied by the broad field of psychology and within the subfield of developmental psychology. Developmental psychology is defined as the study of stability and change throughout the life course. From its establishment as a subdiscipline within the social, behavioral, and biological sciences, developmental psychology had proposed the idea that all humans follow a predictable developmental trajectory. Prior to the 20th century, the scientific community assumed that developmental change after adolescence or early adulthood consisted of the attainment of a developmental plateau, followed by inevitable deterioration

or decline in all areas of function. Throughout the course of the 20th century, theorists slowly began to acknowledge the possibility that true developmental processes may extend beyond the early adulthood years. As researchers, and the disciplines they represented, came to recognize middle adulthood as a viable area of study, the discipline of life span developmental psychology was established as a legitimate and worthwhile enterprise. As a result of this important change in how human development was viewed, the field began to grow and expand, which has led to developmental psychology's current prominence as an area of study within the behavioral sciences.

Many advances have been made because of the previously outlined evolution of the field of developmental psychology. One of the most significant of these was the establishment of what is known as the life span perspective of human development. The life span perspective of development has led to a theoretical approach that is more comprehensive, balanced, and integrated in comparison with previous views or approaches, which tended to be more narrow and limited in scope. The life span concept helped to expand the study of human development beyond issues of infancy, childhood, adolescence, and early adulthood to include both middle and late adulthood. Theses changes, in turn, have led to the establishment of distinct life stages (e.g., early, middle, and late adulthood), as well as identification of specific domains of development (e.g., physical and social) within the life stages. The life span developmental stage of middle adulthood is the focus of this article. Middle adulthood is made up of (approximately) the ages from 40 through 65. Specific domains or areas of development to be addressed include the physical, the cognitive, and the psychosocial.

PHYSICAL DEVELOPMENT IN MIDDLE ADULTHOOD

Physical development consists of changes that take place with respect to the physical body throughout middle adulthood. Some physical changes in midlife are gradual, others are more obvious in the forties and fifties, and most are much more pronounced than the physical changes of early adulthood. Researchers have divided the process of aging into two distinct types of aging, referred to as primary and secondary aging. Primary aging refers to the age-related changes that occur as a result of the passage of time; they are considered to be universal and inevitable. Secondary aging refers to changes that result from the consequences of a person's behavior, and/or society's failure to eliminate unhealthy conditions, including disease states and chronic health problems. Physical changes in middle adulthood are the result of both primary and secondary aging processes.

At some point during the years of middle adulthood, the senses begin a gradual decline in functioning. Vision is often the first sense that shows a noticeable age-related deterioration. Difficulty in reading small print is common, as is a decline in the ability to discriminate nearby objects. Presbyopia is a condition of the eye in which the lens loses its capacity to adjust to objects at varying distances. Bifocals or reading glasses can correct these problems. Other common visual changes include decreases in the ability to drive at night, as well as difficulty with color discrimination. Finally, individuals over the age of 40 are at increased risk for glaucoma, a hereditary disease of the eye in which pressure builds up in the visual system. Visual screenings, medications, and surgery can prevent loss of vision secondary to glaucoma.

The auditory system or ability to hear may also show age-related declines in middle adulthood. Presbycusis is the term given to age-related hearing loss. Studies show that men lose the ability to hear more quickly than women do, at midlife, and that loss of hearing is greatest for high tones. People with significant hearing loss may benefit from hearing aids or from modifications in their interactions with others and the environment.

The skin also shows age-related changes in middle adulthood. Human skin is made up of three layers: an outer, protective layer; a second, supportive layer; and a third, inner layer. As individuals age, the outer layer becomes less firmly secured to the second layer, which changes the appearance of the outer layer. These changes cause the skin to sag and wrinkle. There may be an increase in concentrations of pigmentation in the skin, resulting in age spots. People who have spent extended periods of time in the sun or outdoors (unprotected) age more quickly than those who do not.

The skeletal system and the muscle-to-fat ratio begin to change during the course of midlife. Skeletal changes include weakened bones and reduction in bone density. This often leads to a condition called osteoporosis, which results from insufficient calcium levels (especially in women). An increase in overall body fat and loss of muscle mass and lean body mass are common in the forties and fifties. Regular exercise

can serve to offset weight gain and loss of muscle strength or power.

Beyond alterations in the way we look, middle adulthood is also characterized by changes in the sexual reproductive systems. Although experienced by both sexes, these changes are quite different for women and men. Midlife brings a major biological change for women: the end of the ability to bear children. This transitional period, termed the climacteric, (usually) begins in the late thirties or early forties and is complete at some point in the fifties. There is considerable individual variation regarding the timing and experience of these physiological changes. The most significant change during the climacteric is a decrease in women's production of the hormone estrogen. *Menopause* is the term given to the process of the irregularity and eventual end of menstruation. Many women stop menstruating around age 40, others may continue to have regular periods into their late forties or early fifties, but most women have their last period at some point in their forties. Symptoms related to the climacteric and/or menopause include physical or somatic complications, as well as those related to decreased levels of estrogen. Some of these symptoms may be alleviated with hormone replacement therapy (HRT). While many women benefit from HRT, it is somewhat controversial with respect to the risk/benefit ratio. As with most developmental change processes, different individuals' experiences of the climacteric are quite variable, and occur on a continuum from little or no symptomology, to the presence of life-altering symptoms.

Although men do not experience the significant physiological changes that women go through, they do experience a predictable decline in sperm production levels. Production of sperm can decrease by 30% between the ages of 30 and 60. Enlargement of the prostate is also common for men at midlife. A gradual decrease in levels of the hormone testosterone begins around age 30. Other sex-related changes that men often experience include biological alterations in sexual performance, related to processes such as ejaculation, erection occurrence and/or maintenance, or changes in the experience or frequency of orgasm. Erectile dysfunction may be an issue for men in their forties and fifties. However, the advent of medications to correct this problem has provided relief and return to normal function for many men.

Overall health status shows a decline for most people in the stage of middle adulthood. Average adults at midlife report that they suffer from aches and pains at a higher rate than when they were in their twenties and thirties. About half of adults between 40 and 60 have either a diagnosed disease process or disability or an undiagnosed health problem. Disease-related deaths increase significantly in middle adulthood, the two most prevalent causes being cardiovascular disease (CVD) and cancer. On a positive note, life expectancy for 40-year-olds is higher than ever before and has shown consistent increases over the course of the past two decades. A significant relationship exists between gender and health, with the life expectancy of women exceeding that of men. Despite this fact, women consistently describe their health as poor, suffer more chronic health conditions, and tend to be more restricted in their activities of daily living than men. The question arises as to why it is that men, on average, die younger than women, but are generally healthier while they are alive. Research indicates that the answers to these questions are multifaceted and complex. Three times as many men die from CVD than women between the ages of 45 and 55. Much of this discrepancy can be explained in terms of differences in the physiology of gender. The heart muscles of females who have CVD appear to be better able to adapt to physical stress and exertion. Women also show higher levels of recovery of physical function following a heart attack. Biosocial factors have often been shown to play a role in sex differences related to survival and recovery following CVD and other life-threatening disease processes. In addition, women are more likely to have regular medical checkups and to seek and obtain medical treatment earlier than their male counterparts.

A universal factor that can affect both general heath and well-being is the degree of stress present in one's daily life. We all experience stress, which is variable, and highly individualized to the extent that various life situations are considered to be stress producing for a given person. Stress is defined as the physical and psychological effects that result from events and circumstances that one experiences as requiring greater personal, social, physical, or other resources than one currently possesses. These situations represent a threat to one's ability to meet the demands of a given situation. Research indicates that in certain circumstances stress can actually be beneficial in helping people perform at their peak. However, long-term chronic stress or the accumulation of multiple stressors can lead to both physical and psychological health problems.

Stress and its related effects may be particularly important for individuals in middle adulthood for several reasons. Although stress affects people of all ages, it is during midlife that the effects of both short- and long-term stress become most apparent. The fact that it takes time for stress-related disorders to manifest, combined with the gradual loss of physical capacity often experienced at midlife, may make individuals in this life stage especially vulnerable.

Coping with stress, or stress management, is defined as any attempt to deal with stress; coping responses are also variable, and some are more or less effective than others. Positive and effective ways to deal with stress include reducing identified stressors (when feasible) and/or disclosing and discussing stressful life events with a trusted other. Physical exercise has consistently been shown to reduce the negative effects of stress, as well as significantly slow the aging process. Negative attempts at stress reduction include responses that are characterized by increased levels of anger or aggression, avoidance or denial of stressful events, or overuse of drugs or alcohol. The process of stress management in middle adulthood has the potential to limit age-related increases in disease processes as well as reduce the severity of illnesses that may occur. Finally, the fact that mental health diseases and disorders actually occur less commonly at midlife than in adolescence or early adulthood may be related to more effective stress management in middle adulthood.

To summarize, the course of physical development in middle adulthood has been shown to involve some changes that are both universal and inevitable. However, it has also been clearly demonstrated that many aspects of physical developmental change processes are highly individualized and amenable to the positive effects of individual choices, lifestyles, and volitional behaviors. So while there are specific age-related physical decrements that one must come to accommodate and/or accept, one may also live in such a way throughout middle adulthood so as to optimize one's health and physical functioning well into late middle adulthood and beyond.

COGNITIVE DEVELOPMENT IN MIDDLE ADULTHOOD

Cognitive development at midlife represents the changes that take place with respect to one's thinking, reasoning, decision-making, and problem-solving abilities. A review of the data related to cognition in middle adulthood reveals that two distinct types of cognition dominate the research. These are fluid intelligence and crystallized intelligence. Fluid intelligence refers to the ability to process and analyze basic information, as well as memory skills and the ability to detect relationships. The speed at which one can perform these tasks is also important in fluid intelligence. Crystallized intelligence refers to abilities that are dependent on accumulated knowledge and experience, sound judgment, and mastery of social conventions. Research has shown that fluid abilities predominate prior to midlife, showing a decrease as one ages, and that crystallized abilities are at their highest at midlife and beyond. However, studies also exist that demonstrate relative stability in a variety of tasks related to both fluid and crystallized intelligence. Furthermore, fluid intelligence is thought to be influenced more by conditions in the brain such as memory and processing speed, as well as by learning that is unique to the individual. The acquisition of crystallized abilities appears to be related to the degree to which these abilities are valued by an individual's culture or society. Related to the concept of the influence of culture and society is the cognitive ability referred to as practical intelligence, which is defined as a broad range of skills related to how individuals shape, select, or adapt to their physical and social environments. These skills require an individual to size up real-world situations and analyze how best to achieve goals that have a high degree of uncertainty.

Cognitive development was once thought to be the exclusive domain of childhood and adolescence, with any changes occurring at midlife limited to the decline and deterioration of function. Jean Piaget, perhaps the best known of the cognitive theorists, developed a four-stage theory of cognitive development with age-specific stages beginning in infancy and continuing into adolescence. Piaget's fourth and final stage of cognitive development is termed formal operations. This stage is characterized by the capacity for abstract, scientific thought processes. Individuals engaged in formal operational thought begin with a general theory of all possibilities related to a specific life situation, then progress to specific hypotheses or predictions about what might occur, and finally test various hypotheses.

More recently, cognitive theorists and researchers have described stages of cognitive development that extend beyond Piaget's stage of formal operations. Termed postformal operations, or fifth stage thinking/thought, it is now widely recognized and accepted that

cognitive development may continue into early, middle, and later adulthood. The dynamics of postformal operational theory include a progression from dualistic thinking, characterized by thinking in terms of concrete absolutes, or viewing life in terms of black and white, to relativistic thinking, characterized by the realization that multiple perspectives or shades of gray exist with respect to many life situations. This developmental shift in cognitive abilities occurs in early or middle adulthood, if it occurs at all. Research has shown that this advanced form of cognition is primarily the domain of midlife and includes practical intelligence and dialectical thought. Dialectical thought consists of the components of relativistic thought with the additional capacity to consider multiple perspectives simultaneously. As a more advanced level of cognitive functioning, dialectical thinking also entails the ability to integrate and synthesize information with respect to multiple perspectives, ideas, or experiences and the potential contradictions, inconsistencies, or life dilemmas. Acquisition of the capacity for dialectical thought enables individuals at midlife to effectively cope with changing perspectives of oneself, others, and the world. It becomes clear that few questions, experiences, or relationships have a single unchanging and objective answer or response. Finally, those who achieve the capacity for dialectical thought recognize that while there may be multiple perspectives regarding many life situations, some are more valid or just than others, which facilitates more effective decision making. Practical intelligence is defined as a broad range of skills related to how individuals shape, select, and adapt to their physical and social environments. The skills of practical intelligence are related to those of dialectical processes in that they require one to evaluate real-world situations and determine how best to achieve goals having a high degree of uncertainty.

The potential for postformal operational thinking occurs in late adolescence or early adulthood. The acquisition of dialectical thinking abilities most often takes place during middle adulthood. It should be noted, however, that not all adults develop the cognitive ability required for formal operations and/or fifth-stage thinking capacities.

The longheld belief that middle adulthood cognitive changes were restricted to declines in ability and function have also been refuted by the results of several studies that conclude and/or confirm that while fluid abilities often show a decline in late middle adulthood, this decline is not universal, and is subject to a variety of subjective, individual influences. Much of the data indicate that individuals at midlife can exercise their cognitive abilities, as well as utilize a host of other compensatory strategies to accommodate or make up for decreases in fluid abilities. It is widely accepted that those in the stage of middle adulthood (and beyond) can benefit from cognitive interaction and stimulation, similar to the process of exercise of the physical body. Examples of cognitive exercise include the process of remaining actively engaged with other people in work, leisure, or other situations that enable one to enjoy the benefits of daily, cognitive, human interaction. Other ways to engage or exercise the mind include any activities that involve the acquisition of new learning, problem-solving, or decision-making abilities (e.g., formal education, self-study, reading, creating, or game playing).

A great deal of research is being done on more advanced forms of cognition or intelligence such as expertise, intuition, creativity, and wisdom. The stage of middle adulthood is of particular interest to researchers because many of these cognitive constructs appear to be dependent on or positively correlated with life experience or number of years lived. An expert is defined as someone who is notably more skilled and knowledgeable about a specific intellectual topic or practical ability than is the average person. Not everyone becomes an expert as years pass, but all experts require the passage of years to develop their specific skill level. Expertise is deemed the result of training and long-term practice, which leads to more intuitive, automatic, strategic, and flexible qualities of thought.

Paul and Margaret Baltes developed a theory of adulthood development termed selective optimization with compensation (SOC) to describe the way in which individuals attempt to maintain a balance in their physical and cognitive functioning as they grow older. According to SOC, individuals seek the most effective way to compensate for physical and/or cognitive losses and to become more proficient at the things they can do well.

Cognitive developmental change processes of middle adulthood have been shown to involve much more than decreases or declines in functioning. In response to this fact, developmentalists are now looking closely at patterns of gains and losses in cognition over the course of midlife. Studies have demonstrated that virtually any or all patterns regarding change are possible, and that to ask whether cognitive abilities

increase or decrease may be simplistic. These abilities may demonstrate a variable, up-and-down pattern of change. Questions to be addressed include how many and what distinct cognitive abilities are present in middle adulthood and why a particular person's specific ability might increase or decrease at any given time. Most psychologists have given up on the idea of absolutes with respect to cognitive development at midlife and are instead focusing on concepts and questions related to several cognitive abilities, each of which may show an independent pattern of rise or fall.

PSYCHOSOCIAL DEVELOPMENT IN MIDDLE ADULTHOOD

Psychosocial development includes the changes that one experiences related to self-concept, personality, life experience, and generativity or personal growth. Many, if not all, of these processes are reviewed and/or take on new meaning for those in the life stage of middle adulthood. Some of these processes are universal in that most people experience a specific individual, familial, societal, or cultural phenomenon with minor variations. Other occurrences are highly individualized with respect to gender, age, ethnicity, race, religion, culture, socioeconomic status, education, and several other individual variables. Many developmental researchers and theorists describe the psychosocial change processes that (typically) occur in middle adulthood with slightly different variations or themes that represent a similar dynamic of change. Erik Erikson addresses these changes in his eight-stage developmental theory of psychosocial development that outlines specific tasks or conflicts to be accomplished or resolved at predetermined ages or stages throughout the life span. In Erikson's developmental theory, the conflict to be resolved in middle adulthood is that of generativity versus stagnation. The dynamic of this stage also involves the successful completion of the conflict/task from the stage of early adulthood (identity vs. identity diffusion), as well as preparation for the crisis/task of late adulthood (ego integrity vs. despair). Generativity is characterized by a desire or interest in helping to nurture and establish the next generation through a variety of activities, thereby achieving a sense that one has made a significant contribution to the larger society. For some individuals, this is accomplished by the process of parenting. For others it may also involve activities such as advising, teaching, mentoring, or volunteering at civic, religious, or other charitable organizations. The dynamic to be achieved is one of turning outward from a preoccupation with the self to an expansion toward genuine care and consideration for others.

A psychological construct closely related to the concept of generativity is that of personality. Numerous personality theories have been proposed with respect to the life span (generally) and to middle adulthood (specifically). The most widely researched and accepted theory of personality that currently exists is the big-five factor theory. The big-five theory states that there are five traits or factors that have been found to be consistent and stable throughout adulthood. The five factors are neuroticism, extroversion, openness, agreeableness, and conscientiousness. Research has repeatedly demonstrated intraindividual consistency and stability with respect to levels or amounts of the big-five factors in adulthood. However, interindividual variations or differences are also present in middle and later adulthood. Whether a person ranks high or low on each of the big-five factors is determined by a unique interplay of genes, culture, and early life experiences. Continuity of the big-five factors in middle adulthood has been well established, with the general trend for most individuals to become less neurotic and open and more agreeable and conscientious. The concept of the stability of the personality construct has raised many questions regarding the relative influences of biology, environment, and individual variation or choice. One's personality and related influences possess great power over the course of one's life. Midlife is a period in the life course when most individuals choose a lifestyle and related social context. These choices include significant aspects of one's life, such as vocation, neighborhood, friendship/support network, and routine. A reasonable conclusion that may be derived from the research related to personality is that personality appears to shape one's life, rather than one's life (experiences) effecting changes in personality structure. Aspects of personality do occasionally vary in middle adulthood if life circumstances are dramatically altered in some way. Experiences such as the death of a loved one, beginning or ending a marriage or career, or the occurrence of a severe physical or mental illness may cause changes in the ways that people are known to act or behave. Most often, this indicates minor personality shifts, not dramatic changes of the personality structure.

A change process that has long been believed to be an inevitable event of middle adulthood is the midlife crisis. Defined as a period of increased anxiety, radical life reexamination, and unpredictable transformation,

this concept has recently been closely studied and rethought. It is true that midlife is, for many, a time for life review, examination, reflection, and midcourse correction; however, the concept of a true crisis occurring in a majority of people's lives has largely been found to be false. Recent studies indicate that many individuals in middle adulthood (around age 40) experience a shift in life perspective from years since birth to years left to live. This process often coincides with any number of potentially troubling, personal changes. Perhaps the most obvious is a greater awareness of the biological clock coupled with the (previously outlined) physical signs of aging that occur in one's forties and fifties. Many who thought that there was ample time to accomplish life goals suddenly become aware of the finite nature of the life span.

How one reacts to the challenges and changes of midlife has more to do with personality characteristics and less to do with chronological age or present life span developmental stage. It has been proposed that the enduring nature of a true midlife crisis may be related to its ability to help some adults to cope with the frustration and disappointment caused by the previously discussed life events and still consider themselves to be fairly fortunate.

The concept of role provides a different perspective or interpretation of the various transitions of middle adulthood. All people are part of the larger social system that is made up of interlocking positions or statuses such as worker, student, or widow. A role is the content of a given social position, including the characteristics and behaviors of a person occupying that position. Several aspects of the concept of a role are important for understanding development and change processes. Each person must occupy multiple roles at the same time, which can potentially lead to friction or problems with respect to role compatibility. This situation is termed role conflict and refers to those times when two or more roles are incompatible or present differing demands for which we do not possess sufficient resources. A person may experience role strain when one's qualities or skills do not meet the demands of a particular role. The concept of roles may also help explain some changes in adult life, because certain specific roles are known to show a predictable shift as related to age. Every age or stage of adulthood has accompanying roles of greater or lesser influence with respect to role conflict, strain, or continuity.

Other important and influential factors present in middle adulthood include changes in family and other relationships, changes related to midlife career issues, as well as preparation for retirement. Family and/or relationship issues of midlife range from starting a family, to adjusting to adult children, to caring for aging or debilitated parents, to facing the challenges of divorce or remarriage. The often changing and variable nature of some or all of these factors has led researchers away from the quest for identifying universal, absolute, or predictable stages of midlife development, and more toward an approach that, while acknowledging age-related events, also gives significant consideration to individual variability.

Middle adulthood is shaped by the various life changes and crises that one experiences, both common and predictable, as well as unanticipated. The years between 40 and 65 are in some ways much the same for some individuals and very different for others. In conclusion, it may well be that what is most significant in determining the course of middle adulthood is how one copes with various crises and changes, rather than the changes themselves.

SUMMARY

The developmental stage of middle adulthood is a time of great physical, cognitive, and psychosocial change and variability. It has been shown that the degree or direction of change regarding the specific physical, cognitive, and/or psychosocial domains of development is determined by the unique interplay of a host of influences or factors. Some physical and cognitive change processes once thought to be inevitable and universal have recently come to be viewed as amenable to positive growth and change and highly dependent on the influence of factors such as lifestyle, individual choice, or social context. Many previously established myths related to midlife have been refuted or shown to be inaccurate. The stage of middle adulthood is currently experiencing a highpoint with respect to research interest and study. These efforts have produced new knowledge and insight related to the dynamics of continuity and change over the course of midlife. While the academic community continues to gather information and present new theoretical understandings, there has been a movement toward a greater integration of previously disparate areas of developmental research and related findings.

This is a very exciting and encouraging time for the field of human development and for the study of middle adulthood. It is exciting and encouraging that

those individuals in the stage of middle adulthood can utilize new information and understandings to maximize and enrich their lives.

—David J. Johnson

See also Baby Boomers

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MIDLIFE CRISIS

The question has been raised as to whether or not the classic midlife crisis is a real and empirically defined phenomenon or if it represents a culturally sanctioned myth. It is difficult to provide a definitive answer. Not all midlife adults experience what would be called a crisis. Most, however, would admit to a disruption in their life plans around the ages of 40 to 50. For these individuals, there was an occurrence that required some degree of a personal evaluation of their life. It is said that the midlife crisis is not a marital crisis, or economic crisis, or professional crisis, although it may manifest as such. Underlying this event is the concurrent reevaluation of self ongoing perhaps for different reasons. This deeper evaluation of oneself may produce disturbing results that the individual interprets as a call for a change in one's life. If one makes a change that is inconsistent with societal expectations, it is referred to as a crisis. The typical response is to the act rather than to the precipitating factors.

Although often considered a Western and predominantly male phenomenon, evidence of midlife crises in individuals in middle- and upper-middle-class China and in women has been reported. Perhaps the experience of the self-disturbance has cross-gender and cross-cultural legitimacy; however, the extreme enactment of this crisis is much more of a male behavior. Why might this be so? In general, it has been noted in the literature that men, essentially, have less emotional license than do women. Therefore, when confronted with an emotional upheaval in their lives, men simply do not know how to respond. Their traditional lack of models and belief in self-reliance, emotional control, dramatic action (being a "hero"), and competition may result in stereotypical behavior that is accepted for men experiencing an emotional problem (i.e., getting that hot new sports car, that hot new woman, or drastic lifestyle shift). Unfortunately, the turmoil that precipitated the crisis behavior is not addressed and has the potential to resurface at a later time.

An investigation into the underlying cause of a midlife crisis in two different cohorts of midlifers—those in midlife in the 1960s and 1970s were compared to midlifers in the 1980s and 1990s—resulted in clear cohort differences. The idea of a midlife crisis was still a viable concept for both groups of men. The age of a reported crisis shifted downward to 50 for the midlifers of the 1980s and 1990s. This latter group expressed less of a family focus and emphasized their search for personal fulfillment. The midlifers of the 1960s and 1970s were more focused on escaping an oppressive and forced identity, while the younger cohort was dealing with a quest to find an adult identity at all.

Whether tied to age or life stage, it was concluded that the term *midlife crisis* is commonly used to describe regrets, setbacks, negative feelings, or anxiety about role change. It is clearly tied to the thought patterns occurring at this time. The thought patterns include

increased introspection, realization that time is passing, and regret for lost opportunities. Interestingly, the term *crisis* is defined as "turning point." This definition presents less of a negative connotation to the idea of a midlife crisis when viewed as a midlife turning point. Given this perspective, the midlifer may see the process of self-examination as a positive action. Taking a positive perspective may result in less extreme behavior and a more supportive response from members of society.

—Kathleen C. Kirasic

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MIDWIFE

The origin of the English word midwife has been traced back to 1303, and the literal translation is "with woman during childbirth." Midwives are traditionally although not exclusively women, serve as primary caregivers for childbearing women, and can be found throughout the world. In most developed countries, midwives provide care to the majority of women who give birth, and in many countries this care includes well-woman examinations and provision of family planning services. While there is variation in the educational requirements associated with those who use the title midwife, the International Confederation of Midwives, the World Health Organization, and the International Federation of Gynecologists and Obstetricians have adopted the following definition:

> A midwife is a person who, having been regularly admitted to a midwifery educational program duly recognized in the country in which it is located, has successfully completed the prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery.
>
> She must be able to give the necessary supervision, care and advice to women during pregnancy, labour and the post partum period, to conduct deliveries on her own responsibility, and to care for the newborn and infant. This care includes preventive measures, the detection of abnormal conditions in mother and child, the procurement of medical assistance and the execution of emergency measures in the absence of medical help.
>
> She has the important task in health counseling and education, not only for the woman, but also within the family and the community. The work should involve antenatal education and preparation for parenthood and extends to certain areas of gynecology, family planning and child care. She may practice in hospitals, clinics, health units, domiciliary conditions or in any other service.

In the United States, midwifery, as a profession and philosophical approach to care, predates and now coexists with the provision of medical care to childbearing-aged women. The education of midwives begins with the premise that for the majority of women, pregnancy, labor, and birth are normal human events that should not be medicalized unless indicated by a change in the health status of the woman. The education of doctors takes place almost exclusively in settings where women have developed complications during pregnancy and are in need of continuous monitoring and complicated interventions. This core philosophical difference in approach to pregnancy and women's health care contributed to the elevation of the status of midwifery in the 1970s when women began to express their preference to be actively involved in decisions regarding their health and the health of their babies.

Starting in the mid-1920s, more than 10,000 nurses have been educated as midwives in the United States. Graduates of education programs approved by the American College of Nurse-Midwives Division of Accreditation must take a national certification examination to earn the title certified nurse-midwife

(CNM). CNMs can be licensed to practice in all 50 states and the District of Columbia, and in 2002 CNMs attended over 10% of the vaginal births in the United States. Over 96% of these births occurred in a hospital. The federal government allocates funding for nurse-midwifery education programs and requires reimbursement for CNM services from the Medicaid and Medicare programs.

Additional and more recent educational requirements that are legally recognized in some states include the certified midwife (CM), who is educated in a system designed to be equivalent to the CNM while not requiring a degree in nursing, and the certified professional midwife (CPM). The title CPM grew out of a perceived need to standardize the requirements for those midwives who had traditionally followed the apprentice model of education and to place a higher value on the provision of care in out-of-hospital settings.

In many states, the practice of midwifery is not limited to those who have been licensed by the state; thus, women may receive care from a midwife whose credentials are not clearly defined by law.

—Deanne R. Williams

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MISCARRIAGE

In recent years, scientists have done extensive research on fetal development, with the goal of these efforts being the prevention of deformities and saving the lives of babies endangered by prenatal problems, as well as to ensure that the pregnancy goes to term. In some emergency situations, prenatal blood transfusions have been performed and fetal surgery has been done.

However, most unfortunately, some pregnancies do not last the complete gestational period and result in miscarriage, responsible for the loss of about 30% of all pregnancies. The primary reason that miscarriages occur is probably that the fetus was defective in some way, and the process is a way for the forces of nature to ensure that only the healthiest of offspring and those with the greatest chance of survival will reach term.

Other causes might be a defective ovum or sperm, poor oxygen supply, abnormal development of the umbilical cord, or a lack of nourishment for the fetus to grow. Almost half of all miscarriages also reveal some kind of chromosomal abnormality.

The large majority of miscarriages happen during the first 3 months (or trimester) of pregnancy, and many occur so early that the woman might not have even known she was pregnant. For others, however, the miscarriage that occurs later in pregnancy can be a devastating event, especially for those who had difficulty conceiving. Miscarriages that occur between the first trimester and the time when the fetus might survive on its own (about 25 weeks) leave the parents in a position similar to that of parents who have experienced the death of a child. There are feelings of helplessness and despair. Trained professionals such as grief counselors are recognizing the need to acknowledge this loss, rather than bury it deep in our emotions where it can hurt for years and years. In the past, the father seems to have been left out of the process, perhaps because he was not "physically" involved or because of our cultural beliefs that men are supposed to be strong in spite of their own traumatic experiences.

—Neil J. Salkind

See also Embryo

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MONTESSORI METHOD

Maria Montessori, the first Italian woman physician, began to study education with mentally retarded

children using sensorial materials invented by the French educator Seguin. When the children under her tutelage passed the state examinations given to normal children, Montessori took up the challenge of determining why children in normal schools were not performing even better. Her approach to education was to watch children in a carefully prepared environment, giving them freedom within the bounds of constructive behavior. By observing and reasoning about their responses to the environment, she developed a method of education that appeared to work with their natural tendencies. In this sense she is in the tradition of Rousseau, Pestalozzi, and her contemporary John Dewey. Many of the principles she derived from studying normal children were later discovered in psychology and education research. For example, she believed that children go through sensitive periods when they are drawn to certain stimuli that particularly assist their development during that period; that young children are in a sensitive period for language acquisition; that children have an innate mechanism that assists language learning; that movement and cognition are closely entwined; that concentration leads to self-regulation; and so on.

Although Montessori education is often considered exclusive to preschool, that is only its most popular level. Montessori elementary schools are becoming increasingly common, including in public school systems in the United States. Montessori classrooms for children under 3 years of age and for adolescents are also becoming more common. Montessori classrooms generally have 3-year age groupings: 0 to 3, 3 to 6, 6 to 9, 9 to 12, and 12 to 15.

During infancy (as at all periods), Montessori's emphasis was on freedom of movement, encouragement of independence, and an optimal amount and level of stimulation. To assist young children's development, she recommended that children sleep on mattresses on the floor of a clean, safe room; have a small choice of interesting, developmentally appropriate toys and books that were to be changed regularly; and have their own small table and chair for eating as soon as they were able to sit independently. Infant-toddler classrooms are furnished with what she called "the exercises of practical life," involving sets of materials that allow children to take care of the classroom (sweep, mop, water plants, clean windows, and so on) and their own needs (e.g., prepare snacks) as well as activities to improve their motor control. For example, one set of materials might be for wood polishing. It would be a tray or basket containing a small bottle of polish that a child could easily open and close, a bowl to put polish in, an application rag, and a polishing rag. To do this exercise, the teacher shows the child how to choose a wooden object in the classroom to polish and the series of steps needed to carry out the exercise. From then on, the child could choose wood polishing as an optional activity in the classroom. Children are gradually shown, individually, how to use all the materials in a classroom. They arrive in the morning and choose what activity they want to do. They do it until they are satisfied, then put it away and choose another one. When they have learned to use all the materials in the classroom competently, they are ready to move up to the next level.

Primary classrooms (for 3- to 6-year-olds) also have the practical life exercises, as well as materials for sensorial, math, language, culture, music, art, and geography education. Each area of the curriculum is housed in a different area of the classroom, with the materials all easily accessed by the children. Again, the teacher shows children how to use each material, after which children are free to choose their activities. There are specific ways to use the materials. Some find this too limiting and prefer that children be allowed to explore with the materials. However, the materials are designed to teach specific concepts that Montessori believed were building blocks of intelligence (like attention to dimension, or color). Only when children use the materials in prescribed ways, she believed, are they able to derive the concepts the materials were designed to communicate. In addition, particular uses of materials were intended to help children control their movements and establish self-discipline. She also believed children were attracted to such order. Freedom and choice abound in Montessori education, but at a higher level: what to do, but not how to do it (at least as regards particular Montessori materials).

Another limitation on freedom in Montessori schools is that children are expected to behave in socially acceptable ways. Children who misbehave are redirected to constructive activities and may need to stay near the teacher. Their freedom is thus taken away. Montessori urged that children who misbehave be given their favorite activities but be made to stay in one place, alone, to do them, and allowed to observe the other children. She believed that this process would allow children to observe what they had lost—freedom—by not behaving responsibly and would inspire them to behave better in the future.

Montessori believed that the development of concentration is crucial, because through concentration

children's personalities became "normalized"—her term for an absence of unhealthy behavior. Research on attention and self-regulation is consistent with this idea. Children who are high in self-regulation are able to sustain attention on a single activity or stimulus for a more prolonged period and also are looked on more positively by teachers and other children.

Children in Montessori preschools learn a great deal, such as how to read and write, perform four-digit addition and subtraction problems, know countries of the world and their flags, compose music on bells, and so on. All this is learned through work with materials that organize their learning in small, organized, incremental steps.

In Montessori elementary programs, for 6- to 12-year-olds, children are much more social than they are in the primary program, often opting to work with other children. The opposition to traditional schooling is striking in this regard: In traditional preschools, children often work together, but in elementary classrooms they are usually required to work alone. In Montessori schools, children may choose their social context, but preschoolers tend to prefer to work alone and elementary students tend to prefer to work together. This aligns with the social tendencies psychologists see in children.

In the early 1900s, Montessori could see there was already too much information in the world for it to be learned in the few years one was in school, and so rather than develop a set curriculum, she developed a core from which children could expand and build in directions that interested them. The core Montessori elementary curriculum is structured around five great lessons, told in the beginning of the school year: the story of the universe, the coming of life on earth, the coming of humans, the beginning of writing, and the discovery of numbers. The teacher tells impressionistic stories about each and follows them with series of key lessons given to small groups of children. The intention is that children become inspired by these stories to do their own research and produce reports and charts on particular topics that they are especially interested in. The elementary classroom also has an abundance of hands-on material to teach math, science, language, music, art, and other areas of the curriculum. For adolescents, Montessori's vision was a farm school, where children could apply their knowledge and begin businesses (such as a hotel and a store) to experience having a role in the larger society.

There are no grades or marks in Montessori. Instead, many of the materials are self-correcting, whereas for others, children can correct their own material (e.g., through use of a control material or a calculator), and for others still, the process of repetition and desire for virtuosity are intended to result in excellence over time. Montessori's lack of emphasis on grades and external evaluation is consistent with research on rewards and intrinsic motivation.

Studies of Montessori outcomes are riddled with the usual problems of school studies. The most problematic of these is the lack of random assignment. Parents choose what type of program they want for their children, and parent effects tend to swamp other effects in child outcome research. A second problem is that most studies involve very few classrooms, and teacher effects are therefore often as much a factor as program effects. A third problem is that the implementation of Montessori programs varies widely, and without a mechanism to evaluate the implementation, null effects could be explained as poor implementation. Two studies that did involve random assignment, but had poor Montessori implementations, were conducted as part of Lyndon Johnson's Great Society program. Interestingly, in both studies the Montessori effects were sleeper effects that did not emerge until 3 years after the program (age 7) but that continued as far out as the studies lasted (10th grade) (Karnes, Shewedel, & Williams 1983; Miller & Dyer, 1975; Miller & Bizzell, 1983; Miller & Bizzell, 1984). More recently, a large-scale study was done in the Milwaukee public schools with children who had been in public Montessori classrooms until fifth grade and then had moved into traditional public schools (several of them magnet schools for high-achieving children). Unfortunately the comparison group was a matched sample of classmates at those magnet schools, rather than a group matched prior to the Montessori intervention. Regardless, 5 to 7 years after the intervention, the Montessori children performed higher on standardized tests of math and science, and at least as well as the comparison group on other measures.

—Angeline Lillard

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MOOD DISORDERS

Sadness and happiness are normal moods that most people experience. For some people, though, these moods continue for weeks or months and interfere with their relationships and their performance at work or school. These are cases of mood disorders.

The most common mood disorder is major depressive disorder (MDD). Symptoms of MDD include feelings of depression, loss of interest in activities that were previously enjoyed, changes in appetite (eating less or more than usual) and sleep (trouble falling or staying asleep, or sleeping too much), feelings of worthlessness, fatigue, and difficulty concentrating. Feelings of hopelessness or that life is not worth living can be so severe that they turn into thoughts of suicide or actual suicide attempts. These symptoms are present most of time for at least 2 weeks, but in severe cases, they can last for years. Approximately 17% of the population will experience an episode of MDD in their lifetime, with women outnumbering men more than 2 to 1.

Some people who experience MDD also have episodes of mania, indicating bipolar disorder (sometimes called manic-depression), where sufferers alternate between their normal mood and episodes of major depression and mania. In manic states, people feel extremely good, hyper, or excited beyond their normal experience of good moods. They feel rested after only a few hours of sleep, talk so fast that it can be hard for others to get a word in, and are easily distracted by thoughts racing through their heads. People in manic states often engage in dangerous activities, such as spending a lot of money, becoming sexually promiscuous, driving recklessly, or beginning risky business ventures. These episodes are often so severe that individuals must be hospitalized for their own safety. Bipolar disorder affects 1.2% of the population.

Dysthymia is a mood disorder in which people feel depressed most of the day, more days than not (more than half of the time), for at least 2 years. Many people with dysthymia say that their moodiness lasts much longer and is a part of their personality. When people with dysthymia feel down, they have symptoms that are a lot like MDD, but are not as severe. However, up to 90% of people with dysthymia also have periods of MDD. When MDD occurs in a person with dysthymia, it is called "double depression." Dysthymia affects about 3% of the population.

Mood disorders typically begin in late adolescence, but they can occur in childhood. The elderly also experience mood disorders, although these cases usually are not first episodes. Once a person has an episode of a mood disorder, more episodes are likely to occur, particularly following stressful life events.

Biological, psychological, and environmental factors appear to interact in complex ways to produce mood disorders. Bipolar disorder often runs in families and is thought to be partly genetic. However, changes in stress level and sleep patterns can trigger manic or depressive episodes in patients with bipolar disorders. There may be genetic links in some cases of MDD, but psychological reactions to stressful life events also play a role.

Fortunately, mood disorders can be successfully treated. Antidepressant medications are commonly used treatments for all mood disorders. Cognitive behavior therapy and interpersonal therapy are very effective in treating MDD, and very severe cases often improve with electroconvulsive therapy. Bipolar disorder is best treated with lithium, a mood-stabilizing medication, or anticonvulsant medications, but psychotherapy in addition to the medication can help extend the time until the next episode. Dysthymia can be treated with a combination of medications and a cognitive-behavioral analysis system of psychotherapy, a therapy that targets long-standing mood symptoms.

—Carolyn M. Pepper

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MORAL DEVELOPMENT

Scholars have trouble reaching a consensus as to the best definition of morality. At the very least, they usually agree that it has to do with acts that affect rights, duties, and the welfare of others. Beyond this, there are disagreements.

Some people think that morality is subjective, meaning that it is based on feelings and nothing more. However, cognitive-developmental psychologists do not think they are subjective because moral judgments are backed by reason, not feeling.

Others think that morality is culturally bound. It is true that different cultures have different beliefs, but does that mean that all are right? For example, some cultures have held the belief that the earth is round, whereas others have believed that the earth is flat. Clearly, both cannot be right. Also, just because different cultures have different beliefs, it does not mean that they have different underlying values. Say, for example, a culture prohibits the consumption of cows because they believe that the spirits of the deceased sometimes inhabit cattle. Although other cultures may allow the consumption of cows, it is not because they do not share the same underlying value of respecting their deceased relatives. All cultures agree on some fundamental values, such as caring for infants and prohibiting murder, because they are necessary for society to function.

There is also the belief that morality is based on religion. Morality is a matter of reason and conscience; it is not a matter of religious faith. In one study, researchers wanted to know if Amish-Mennonite and Orthodox Jewish children could distinguish between moral and religious rules. Most of the children studied thought it would be okay for people who belong to other religions not to wear the traditional head coverings of their own religions, but they believed that stealing would not be okay, even if God commanded it. Although religion often promotes moral behavior, morality is not dependent on religious faith, and many religious rules have nothing to do with morality.

Social convention is also often mistaken for morality. Psychologists distinguish between moral rules, personal issues (such as with whom one should be friends), and social conventions (such as addressing certain people as "Dr." or "Ms."). Researchers have found that mothers treat violations of social conventions differently than violations of moral rules when they discipline their children. There is also evidence that children as young as 3 years of age know the difference between moral rules and social conventions.

So how do psychologists decide when an act is immoral? One way to tell is to ask if other people can legitimately interfere with the person doing the act. If others have no right to interfere, the act is probably a personal issue and not a moral one. For example, it would probably be considered repulsive if a family were to decide to eat their pet that had been killed in a traffic accident, but it would be unlikely that anyone would do anything to try to stop them. On the other hand, if one were to know that a neighbor was being beaten by a spouse, they would likely feel justified to intervene.

Another way to decide if an act is immoral is to ask if it would be unacceptable in all human societies. Immoral acts should be universally prohibited. Torture, slavery, and child abuse are immoral. Irrespective of time or place, morality is a set of universal principles agreed upon by all humans.

HOW DOES MORALITY DEVELOP?

Psychologists who study moral development typically take one of three different approaches. Some psychologists are most interested in the reasoning behind moral action. Others think that the emotions that drive moral behavior are more important. And still others focus on moral behavior itself. Although most psychologists take an integrated approach to moral development, most pay more attention to either moral thinking or moral emotion.

Piaget and Intention

Jean Piaget was one of the first influential theorists to study moral development. Working from a cognitive-developmental perspective, he focused on judgment and reasoning. He found that as children mature, they develop increasingly complex and flexible understandings of morality.

Piaget used hypothetical examples to learn more about how children reason about moral issues. One of his most well-known examples is as follows.

A little boy who is called John is in his room. He is called to dinner. He goes into the dining room. But behind the door there was a chair, and on the chair there was a tray with 15 cups on it. John could not have known that there was all this behind the door. He goes in, the door knocks against the tray, bang go the 15 cups and they all get broken!

Once there was a little boy whose name was Henry. One day when his mother was out he tried to get some jam out of the cupboard. He climbed up on a chair and stretched out his arm. But the jam was too high up and he could not reach it and have any. But while he was trying to get it, he knocked over a cup. The cup fell down and broke.

After telling children these two stories, Piaget asked, "Which boy was the naughtiest?" What he found was that younger children evaluated these stories differently than older children did. The younger children in his study considered the consequences of the actors' behavior and tended to claim that John was naughtier because he broke 15 cups whereas Henry only broke one. The older children, on the other hand, considered the actors' intentions, and they tended to say that Henry was naughtier because John did not mean to break all those cups. (Technically speaking, neither boy broke cups on purpose. Henry was merely careless, whereas John was not because ". . . he could not have known that there was all this behind the door").

Piaget concluded that young children decide what is right or wrong based on what adults tell them. They think of rules as rigid and to be obeyed without question. He argued that as children grow older, sometime around the age of 8 or 9, they come to understand that rules are created primarily to help people to get along and that rules can be changed if everyone agrees to the change.

So why did the younger children think that breaking more cups was naughtier? Some have speculated that adults may punish children based on the amount of damage caused by their misdeed. Others have argued against Piaget's contention that young children do not consider intention. They have proposed that younger children have limited cognitive ability and may therefore make their judgments based on the amount of physical damage because it is easier for them to evaluate. Subsequent researchers have found that even 5-year-olds are hardest on someone who breaks a toy intentionally, least hard on someone who breaks something accidentally, and rate someone who breaks something out of negligence somewhere in between.

Kohlberg's Stage Theory

Most of the recent moral development research is based on the work of Lawrence Kohlberg. He also took a cognitive-developmental approach to the study of morality and therefore was most interested in moral reasoning. And like Piaget, he also used hypothetical dilemmas to learn more about how people think about moral issues. His most well known dilemma is as follows.

In Europe, a woman was near death from a rare form of cancer. There was one drug that the doctors thought might save her, a form of radium that a druggist in that same town had recently discovered. The druggist was charging $2,000, ten times what the drug costs to make. The sick woman's husband, Heinz, went to everyone he knew to borrow the money, but he could only get together about half of what the drug cost. He told the druggist that his wife was dying and asked him to sell it cheaper or let him pay later. But the druggist said no. So Heinz got desperate and broke into the man's store to steal the drug for his wife.

Should Heinz have stolen the drug? Kohlberg presented a number of moral dilemmas like this one to people of various ages and asked them to propose solutions to each one. In truth, he was more interested in the reasoning behind the decisions people gave than in the actual decisions themselves.

Based on the responses to his moral dilemmas, Kohlberg proposed that the development of moral reasoning is characterized by a series of stages. He suggested that individuals progress through these stages in an invariant sequence, each stage reflecting a more integrated and logically consistent set of moral belief than those before it.

Kohlberg grouped his six stages into three levels: the preconventional level, the conventional level, and the postconventional level. At the preconventional level, right and wrong are determined by what leads to reward or punishment. Most elementary school children, some middle school children, and a few high school students fall into this category. Preconventional individuals will obey people with the power to reward or punish.

Within the preconventional level, Kohlberg identified two stages. Individuals in stage 1 make moral decisions based on what they think will most benefit themselves without considering the needs of others. Actions are only considered wrong if they lead to punishment. Those who have advanced to stage 2 have begun to realize that others have needs as well. They have adopted a "you scratch my back, I'll scratch yours" mentality (although they usually try to make sure they are getting the better end of the bargain). To them, being "fair" means that everybody gets the same opportunities, but like individuals in stage 1, those in stage 2 only focus on the physical consequences of their behavior.

Many high school students, some middle school students, and a few older elementary school students exhibit what Kohlberg referred to as conventional morality. This level is characterized by an acceptance of society's conventions of right and wrong. Rules are obeyed even when there is no reward for obedience or punishment for disobedience. The appropriateness or fairness of a rule is seldom questioned.

Kohlberg also identified two stages within the conventional level. Individuals in stage 3 look to people close to them and to authority figures for guidance about right and wrong. They try to treat others as they would like to be treated and to please others to gain approval. Stage 3 individuals are also able to consider the perspectives of others when making decisions. They acknowledge that intentions must be considered in determining guilt or innocence.

Individuals in stage 4 look to society as a whole for guidance about right and wrong and realize that rules are necessary to keep society running smoothly. On the other hand, they do not realize that it may occasionally be morally justifiable to break laws, nor do they acknowledge that as society's needs change, rules may need to change as well.

Postconventional morality was Kohlberg's highest level of moral reasoning. It is rarely observed in students before they reach college. In fact, most people never reach this level of reasoning at all. At the postconventional level, people have developed their own set of abstract principles of morally right and wrong. These typically include the basic human rights of life, liberty, and justice. People at this level obey rules consistent with their principles of morality and disobey rules inconsistent with such principles.

The first stage at the postconventional level is characterized by the understanding that rules and the democratic process make up a social contract. Those at stage 5 see rules as a way to maintain social order and protect individual human rights. They also recognize the flexibility of rules and think that rules that no longer serve society's interests may be changed.

At stage 6, individuals answer to a strong inner conscience and willingly disobey laws that violate their own ethical principles. Such principles typically include respect for human dignity and basic human rights, the belief that all people are equal, and a commitment to justice. Stage 6 is Kohlberg's ideal stage that few people ever reach.

Examples for Each of Kohlberg's Stages of Moral Development

Preconventional Level

Stage 1. Okay to cheat if you do not get caught

Stage 2. Okay to cheat as long as you show your friends how to cheat as well

Conventional Level

Stage 3. Not okay to steal cars because it will disgrace your family

Stage 4. Not okay to steal cars because it is against the law

Postconventional Level

Stage 5. Not okay to steal because it violates the social contract that protects individual human rights and social order

Stage 6. Okay to steal food if you are starving because human life is more valuable than law

Why do we see such variation in moral development at any given age? Kohlberg proposed that moral development is somewhat dependent on cognitive development. In order to grasp the more abstract concepts of postconventional reasoning, one must have attained a level of cognitive sophistication that young children do not yet have. But advanced cognitive abilities do not guarantee advanced moral reasoning. In other words, cognitive development is necessary but insufficient for moral development.

Disequilibrium may also help explain why some people move to higher stages sooner than others.

Piaget proposed that when children experience disequilibrium, meaning that they witness an event that cannot be explained by their current understanding of how things work, they adopt new representations of how things work in order to explain their experiences. Similarly, Kohlberg proposed that as people become increasingly aware of the weaknesses in their current way of reasoning about moral issues, they begin to restructure their thoughts and gradually move from one stage to the next.

Subsequent research of Kohlberg's stage theory has supported his idea that people tend to progress through the stages in the sequence that he proposed but has found that people do not always reason in the same stage. Often their reasoning will reflect a particular stage but will sometimes reflect a stage below or a stage above. Researchers have also found that children are not as authority oriented as Kohlberg suggested. Other scholars have also pointed out that Kohlberg's theory only explains how people reason, not what they actually do. There seems to be an imperfect relationship between moral thinking and moral behavior, possibly because nonmoral considerations, such as what is the easiest or most practical action to take, are not factored in.

Gilligan and Gender Differences

Carol Gilligan challenged Kohlberg's theory based on his definition of morality. She argued that Kohlberg's definition of morality was based solely on the notion of justice. She proposed an "ethic of care" in which fairness in terms of an equal distribution of resources is not always the most ethical action. Because girls are socialized differently than boys, she argued, they tend to place more of an emphasis on meeting everyone's needs. Therefore, girls should be more likely to base their moral judgments on making sure that everyone is cared for.

The idea that girls rely on an "ethic of care" while boys use an "ethic of justice" has not been empirically validated. There does not appear to be much difference between the way that boys and girls reason about moral issues. Both genders use both orientations, although some studies have found differences between genders in which moral dilemmas they think are most important.

Other researchers are less interested in moral reasoning and instead choose to focus on the emotions that drive moral action. Those who focus on the emotional components of moral behavior suggest that people act morally out of love, attachment, sympathy, and empathy. To act immorally would bring shame, guilt, and anxiety.

Freudian Guilt

Sigmund Freud was one of the first psychologists to explain moral behavior in terms of guilt and other emotions. He theorized that moral energy resulted from repressed sexual impulses. At about the age of 3, Freud claimed that children become sexually attracted to their opposite-sex parent and hostile towards their same-sex parent. This is what is referred to as the Oedipus complex (if the child is a boy) or the Electra complex (if the child is girl). Because children realize that they cannot express these emotions overtly, they repress these impulses and use this energy to drive moral behavior.

When children successfully resolve their Oedipus or Electra conflict, they identify with their same-sex parent and, in turn, internalize their parent's code of moral conduct. The violation of a moral rule then leads to guilt and anxiety.

Although researchers in the field of child development agree that the avoidance of guilt contributes to moral behavior, most of them do not think that guilt is the result of the repression of sexual or hostile impulses. They think guilt is the result of parental disapproval stemming from children's wrongdoing. Parents who rely on inductive discipline (using reasons when disciplining children, especially pointing out the harmful effects of certain behaviors on other people), in particular, raise children who internalize moral rules and feel guilty when they violate them.

Empathy

The most common emotion studied in relation to morality is empathy. Empathy is an emotional response to the perception of another person's emotional state that is congruent with the other's emotional state. Empathy is usually positively related to measures of prosocial behavior. Prosocial behavior includes positive social behaviors such as sharing, helping, and comforting. It has been suggested that empathy does not always lead to prosocial behavior because empathy may cause so much distress that it may cause people to feel the need to escape the situation instead of helping. The relationship between empathy and prosocial behavior is usually stronger for

older children and adults because they have more control over their emotions and are more likely to sympathize than to feel distress.

How does empathy relate to moral behavior? Is there not a difference between helping people you know and a global morality? Hoffman has proposed that empathy and prosocial behavior in children are usually directed at friends and others whom the child likes. Eventually, this behavior expands to encompass all people, leading to a more just morality. Hoffman also thinks that the happy emotions that result from empathy-driven prosocial behavior are a significant motivational force even when behaving morally conflicts with self-interest.

Eisenberg's Levels of Prosocial Reasoning

Nancy Eisenberg was specifically interested in prosocial behavior. Like Kohlberg, she used moral dilemmas, such as the following, to study children's reasoning.

One day a girl named Mary was going to a friend's birthday party. On her way she saw a girl who had fallen down and hurt her leg. The girl asked Mary to go to her house and get her parents so the parents could come and take her to the doctor. But if Mary did run and get the child's parents, she would be late for the birthday party and miss the ice cream, cake, and all the games. What should Mary do? Why?

The reasons that children gave for their decisions helped Eisenberg to identify five developmental levels of prosocial reasoning.

1. Hedonistic: pursues own pleasure
2. Needs-oriented: concerned with the needs of others but does not demonstrate internalized prosocial norms
3. Approval, interpersonal: acts to gain social approval or stereotyped

4a. Self-reflecting empathy: expresses sympathy and says how action or inaction would lead to positive feelings or guilt

4b. Transitional: reasons based on internalized values, but these ideas are not clearly stated

5. Strongly internalized: reasons based on internalized values and is concerned with maintaining self-respect by living up to one's values

Most preschoolers and many elementary school children reason at the hedonistic level, which means they primarily look out for themselves and decide whether to help based on how much they like the person in need. But there are also some preschoolers as well as many older children who reason at the needs-oriented level. These children are concerned with the needs of others, although do not directly express sympathy.

Eisenberg's third level is very similar to Kohlberg's third stage. Children who reason at this level try to do what they think a good person would do. Some elementary and high school students fall into this category.

Those who reason at Eisenberg's fourth level explicitly take the perspectives of others and understand the need to protect people's rights. Many high school students and adults reason at this level. Finally, like Kohlberg's postconventional level, those who reason at Eisenberg's highest level are motivated to live up to their own moral code. A few high school students and adults reason at this level.

But does prosocial reasoning predict prosocial behavior? The relationship between prosocial reasoning and prosocial behavior is imperfect. Eisenberg has suggested that this is because prosocial reasoning is only one factor that influences prosocial behavior. Other factors include the interpretation of the situation, whether empathy is felt, and beliefs about the costs and benefits of helping. Prosocial behavior also requires knowing what to do and having the perceived ability to do it. And lastly, children also need self-control to follow through in order to carry out prosocial behavior.

Although Eisenberg's model is relatively new and has not been extensively tested yet, current data support her stage model of prosocial reasoning.

The relationship between moral reasoning, moral emotion, and moral behavior is not very impressive. A stronger correlation, although not as strong as some researchers would like, is found between moral reasoning and moral behavior. One factor that may contribute to this less-than-perfect relationship is moral obligation. A person can understand what the right thing to do is and still not feel obliged to do it.

CAN MORALITY BE TAUGHT?

In light of current social trends, "character education" has become increasingly popular. Many are quick to blame youth violence and risky health behaviors on a lack of character. Others think the best

reasons for including ethics and morality in the curriculum may be less rooted in "fixing" young people and more rooted in the importance of human flourishing and citizenship. As technology advances, we become more and more of a global community. This growing interdependence could be the best reason to attempt to foster moral development.

But can morality be taught? Many scholars and educators think that it can be taught but disagree as to the best method of doing so. Instilling values in others is difficult at best.

Modeling and Induction

Some of the most traditional methods of moral education rely on modeling. Children learn not only by what adults say, but also by what they do. Induction, or the practice of explaining to children why a certain behavior is unacceptable (often with a focus on the pain or distress that this behavior has caused another), is another effective way to promote moral development. The purpose of both modeling and induction is to help children internalize their family's and/or community's values.

Family and friends are not the sources of learning for children. Children learn how the world works from the books they read, the television programs they watch, and the Internet sites they visit. In other words, pop culture also serves to educate. Researchers interested in moral development realize the powerful influence of pop culture and use it to provide positive modeling. *Sesame Street,* for example, has included a strong prosocial message in its curriculum since its inception in 1969. More recently, however, psychologists have begun to apply cognitive-developmental principles to moral education curriculums.

Cognitive-Developmental Approaches to Moral Education

Cognitive theorists think that moral development is based on interpretation and reasoning. Kohlberg, like other cognitive-developmental psychologists, thinks that moral development is the result of cognitive disequilibrium. In other words, it is only when people realize the limitations of their current way of reasoning that former ideas are abandoned in favor of reasoning at higher levels.

When does cognitive disequilibrium occur? It is most likely to occur when reasoning is challenged by someone who reasons at the next higher level. Because of this, Kohlberg has suggested the use of moral discussion in order to promote moral development. Not only are moral discussions useful in challenging the current level of thinking, but they also improve perspective-taking ability. Although moral discussion can take place in the classroom, it most often happens with parents and peers. Research suggests that peers are most influential.

Another important element is a social environment in which justice and a sense of community prevails. In order to create such an environment, Kohlberg developed what he called the "just community." The just community was based on self-governance and democracy. Just communities set up in public high schools consisted of about 100 students and five teachers. They operated as special "schools within a school." All decisions for the group were made by majority rule. Teachers did not have veto power but were responsible for encouraging the students to think about the moral implications of their decisions. Only a few just communities were actually set up, but they were effective in promoting moral development.

Most current moral curriculums are based either on modeling character or on teaching reasoning by challenging students with moral dilemmas. Darcia Narvaez has proposed a new moral education curriculum based on the idea of "moral experts" or those who automatically perceive the ethical implications of a situation that others may not. Her moral education model, called the ethical expertise (ETHEX) framework, is based on the idea that moral reasoning can be broken down into a list of specific skills such as the ability to take the perspective of others and the ability to understand consequences. Narvaez contends that in order to help people become "moral experts" they need to acquire and practice these specific skills. Although this program is too new to have been sufficiently independently evaluated, the integrative approach that Narvaez took, utilizing what researchers know from the fields of cognitive psychology, social psychology, and the moral education tradition, makes this curriculum promising.

Parenting Style

Parents and caregivers can be very influential in helping to shape ideas and direct behavior. It is important that parents make the rules for moral behavior clear and that they express them in an

emotionally intense way so that children will pay attention. Parents should also be sure to place the highest value on moral behavior, trying not to overemphasize achievement.

One of the most effective ways for parents to promote moral development in children is for them to give reasons for discipline. Explaining to children how their behavior affects other people is beneficial because it encourages perspective taking. Research suggests that prosocial behavior is encouraged when mild punishment is paired with a focus on the hurt and distress that their behavior has caused others.

Maybe most importantly, parents need to model warmth and empathy. They should not only talk about moral issues with their children but they should also try to create a positive emotional environment. Authoritative parenting, or maintaining high standards of behavior in addition to demonstrating emotional warmth, is especially effective.

—Elyse A. Warren

See also Gilligan, Carol; Gilligan's Theory of Feminine Morality; Kohlberg, Lawrence; Stages of Moral Development

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MORAL REASONING

Each day we are confronted with decisions about right and wrong. Should you cheat on an examination? Should you tell the cashier you have received the incorrect amount of change? It is ever acceptable to steal? Each of these scenarios is a dilemma that elicits judgments about right and wrong, or moral judgments. Moral reasoning refers to our thinking about moral dilemmas, our consideration of available options in resolving moral dilemmas, and our explanations for our moral judgments.

According to Lawrence Kohlberg (1927–1987), an American psychologist famous for his theory of moral reasoning, people progress through a series of stages or steps in the development of their moral reasoning. There are six stages of moral reasoning that are classified into three levels, representing the individual's view of himself or herself in relation to the conventions of society, and thus, three views of the world and three approaches to solving or explaining decisions about moral dilemmas. The stages are loosely associated with age because moral reasoning is thought to progress parallel to developments in thinking and social awareness.

PRECONVENTIONAL REASONING (LEVEL 1): INDIVIDUALIST PERSPECTIVE

Most elementary school–aged children demonstrate preconventional reasoning. At this level of moral development, individuals do not identify with rules and instead view rules and social norms as being imposed upon them. Children at the preconventional level of reasoning respond to moral dilemmas in ways that focus on avoiding punishment and gaining rewards.

At the first stage, punishment and obedience orientation, good or bad behavior is interpreted in terms of tangible consequences, whether the behavior is punished; punished behavior is seen as bad. People at this stage follow rules to behave in socially appropriate ways because they are told to do so by authority figures, such as parents and teachers, who threaten

punishment. Therefore, rules are followed in order to avoid punishment.

During the second stage, instrumental exchange orientation, people conform to authority and rules in order to obtain rewards. In other words, what is morally right satisfies an individual's own desires; right behavior means acting in his or her own interests, rewarding himself or herself.

CONVENTIONAL REASONING (LEVEL 2): SOCIAL PERSPECTIVE

Conventional reasoning is guided by the social perspective of a member of society and emphasizes abiding by social norms and laws, receiving approval from others, and maintaining social order. Most adolescents and adults reason at the conventional level.

During the first stage of this level (stage 3), good boy–good girl orientation, individuals are concerned with being a good person in their own eyes and in the eyes of others. People conform to societal norms, needs, and values in order to gain the approval of others.

At the second stage at this level (stage 4), law and order orientation**,** individuals expand their focus on social needs and values to emphasize abiding laws, obeying authority, responding to the obligations of duty, and maintaining social order. Laws and social rules are not questioned; people's duties are to uphold and respect social order. At this stage, people come to believe that laws are absolute and must not be broken because they act to maintain social order and keep society functioning.

POSTCONVENTIONAL REASONING (LEVEL 3): PRIOR TO SOCIETY PERSPECTIVE

The third level of reasoning, postconventional reasoning, is not reached by the majority of adults; it is rare. At the postconventional level of reasoning, societal rules and laws are seen as subjective and relative, subject to change given the circumstances. In this way, the individual differentiates himself or herself from social norms, values, and laws. Instead, values are defined in terms of moral principles voluntarily taken rather than as conventional standards to be upheld. These moral principles are valid apart from individuals and groups.

At the first stage of this level (stage 5), social contract, reasoning becomes relativistic in that people recognize that there are many conflicting perspectives on moral issues; values are relative, laws are arbitrary, and standards vary among people. People have a moral duty to abide by laws and societal standards as long as those laws and standards support human ends. There also emerges an understanding that some values, such as human life, are more important than law. At stage 5, people abide by laws as long as they support human ends—there is a genuine interest in the welfare of others.

The final stage (stage 6), universal principles, is the highest stage in Kohlberg's scheme and is unusual to reach. Because so few people reach this stage, Kohlberg was able to identify some nominees for this substage but was not able to empirically establish it. At the final stage of reasoning, people develop their own moral standards based on broad abstract principles, such as justice for all and respect for human rights and dignity. Values are established by individual reflection and meditation and might contradict egocentric and legal views of earlier stages. Now the individual reasons with self-chosen principles that place the highest value on human rights.

HOW DOES MORAL REASONING DEVELOP?

Children, adolescents, and adults develop through the stages of moral reasoning in sequential fashion, one at a time, never skipping a stage. Each stage builds on the reasoning of the stage below it, transforming that foundation into a new way of approaching moral dilemmas. Development is a life-long process in which few people reach the final stages of moral reasoning.

Moral reasoning is stimulated by exposing people to reasoning that is one stage higher than their own. If individuals are presented with moral dilemmas for discussion that present them with moral rationales one stage above their own, they can come to see the reasonableness of the higher stage and move their own reasoning toward the next stage. Formal education is associated with higher levels of moral reasoning because individuals who enroll in higher education are more likely to be exposed to issue-focused, critical, and thought-provoking discussion, which exposes them to higher levels of reasoning and prompts stage development.

Moral reasoning also depends on other forms of development. Cognitive and social development are prerequisites for moral reasoning such that individuals must reach particular levels of cognitive reasoning ability and

social awareness in order to display moral reasoning characteristic of a given stage. Social stimulation and interaction with others are vital to the development of moral reasoning because they provide opportunities to engage in perspective taking, and to be exposed to more advanced levels reasoning and thereby contribute to stage change. Opportunities to take the point of view of society's basic institutions, including law, economics, and government, influence the development of moral reasoning. The more a child participates in any social group, the more opportunities he or she has to take the social perspective of others. Therefore, participation in some group, in which there is mutuality of role taking and issue-focused discussion, is essential to the development of moral reasoning.

SUMMARY

Moral reasoning is how we make decisions about moral dilemmas, decisions about right and wrong, including what options we consider and how we explain our decisions. The development of moral reasoning is a life-long process in which people progress through six stages, grouped into three levels representing the individual's view of himself or herself in relation to the conventions of society, from self oriented to society oriented to principled.

—Tara L. Kuther

See also Gilligan, Carol; Gilligan's Theory of Feminine Morality; Kohlberg, Lawrence

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MORTALITY

Life expectancies have increased in the United States over the past century because of better health care, better nutrition, and vaccines. In 1900, the average American lived to be about 47 years of age; by 1997, the average American lived to be about 76. Life expectancies have also increased in most every nation in the world this past century; however, life expectancies are much more variable in developing countries. Although biological, genetic, and socioeconomic factors matter, behavioral factors also play a strong role.

MAJOR CAUSES OF MORTALITY

As health technology has increased, the major causes of mortality have shifted from infectious diseases to causes substantially influenced by behavioral or lifestyle factors. In the United States, heart disease is the leading cause of death, followed by cancer and accidents, all of which are also influenced by behavioral factors (e.g., diet, smoking, drinking, risk taking).

Racial Differences

African American mortality rates are higher than white rates, particularly those of African American males, whose average life span in 1997 was 69.9. Relatively high death rates from acquired immunodeficiency syndrome, drug abuse, and violence account for much of the high mortality rates among African American males. For example, blacks constitute 12% of the American population, but 48% of murder victims. Black males from 15 to 34 are seven times more likely to be murdered than white males.

Gender Differences

In the United States, men die about 6 years earlier than women, and this gender difference holds for most every nation. Sex differences in mortality have widened over the past century as well. This is due partly to a reduction in women's mortality during childbirth and partly to an increase in men's mortality from heart disease and lung cancer. Many accept this gender difference as "natural," but gender roles are a factor. Men are more reluctant to visit doctors and to take active control of their health. Thus, chronic and serious health problems may be diagnosed late, increasing the risk for

mortality. Death causes with the largest gender ratios (men dying at larger rates than women) tend to have large behavioral components. Men are much more likely than women to die from accidents, liver disease (linked largely to drinking), homicide, suicide, and human immunodeficiency virus infection. In each of these cases, risk taking can be implicated and risk is associated with the masculine gender role.

QUALITY OF SOCIAL RELATIONSHIPS

The quality of one's social relationships significantly impacts health factors and mortality. Loneliness has been shown to be a risk factor for various types of mortality. Causal factors include lonely people receiving less comprehensive medical care and having higher levels of cumulative stress, which leads to poorer health. Lonely people are also more likely to commit suicide. Similarly, research on both humans and animals has shown that social isolation is a risk factor for mortality.

Conversely, social support has been shown to buffer stressors that can increase risk factors for illness and death. People with the highest levels of social support may be two to three times less likely to die than people with the lowest levels of social support. A good deal of research has documented an increased risk for death among persons with few or low-quality social relationships. At the cultural level, cultures that stress interdependence and collectivism (where social relationships are strongest) tend to have lower rates of stress-related diseases and mortality than more individualistic cultures.

SUMMARY

Although life expectancies have increased over the past century with advances in medicine, mortality is strongly affected by behavior. Impoverished social relationships, restrictive gender roles, risk-taking behaviors, and health neglect all contribute substantially to mortality.

—Joseph A. Vandello

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MOTIVATION

Motivation is everywhere. Whether it is adults working 60-hour weeks, students studying for an examination, children playing a sport, or a baby crying for food, motivated behavior is ubiquitous. Psychologists are interested in a wide variety of motivations, ranging from behaviors that satisfy basic physiological needs (e.g., hunger, thirst) to those that lead us to play and explore as we attempt to master our environment. This entry provides a brief overview of different perspectives in the field of motivation and briefly examines the types of controversies studied by motivation researchers.

Motivation is defined as that which moves us to action and is evident in subdisciplines such as social, personality, developmental, experimental, industrial-organizational, physiological, and cognitive psychology. One critical theme in the study of motivation centers on identifying the underlying reasons for why a person is motivated to behave in a certain way. Consider why a college student eats at the school cafeteria. Is this student eating to reduce a physiological drive? Because it is a convenient way to socialize with friends? Because he has paid for a meal plan and feels obligated to eat? Because the food is so readily available? Because he associates a certain time of day with eating? Because he is taking part in an ice cream–eating contest? Or simply because he enjoys the taste of cafeteria food?

Consider why a college student plays basketball for the school team. Is this student playing in an attempt to master her environment? To satisfy social needs? Because basketball is associated with pleasant memories from her childhood? Because she enjoys the game

of basketball? Because she hopes to find a career as a professional basketball player? In both examples, each possibility represents a different source of motivation and highlights the complex nature of human behavior.

BEHAVIOR = PERSONALITY × ENVIRONMENT

Kurt Lewin, generally regarded as the father of social psychology, emphasized the roles of both personality and environmental factors when trying to determine the cause of a behavior. According to Lewin, a proper understanding of behavior requires both agent and circumstantial elements. In this respect, Lewin's theory is consistent with the nature-nurture distinction, an overarching theme in the field of psychology. As a result, it is critical that we account for both internal (e.g., genetic history, personality) and external (e.g., environmental rewards) sources of motivation that cause behavior.

INTERNAL SOURCES OF MOTIVATION

Drive Theory

Drive theory, proposed by Clark Hull, posited that all motivated actions stem from attempts to reduce one of four basic drives: hunger, thirst, sex, and pain avoidance. According to this theory, drives stem from discrepancies between our desired and actual states in these four areas, and we are motivated to reduce these drives. Thus, if one is hungry, consuming a four-course meal should eliminate the hunger drive. All of these drives connect closely to what drive theorists argue is our primary motive: survival.

Evolutionary Psychology

The evolutionary perspective of motivated behavior is closely related to these survival instincts and proposes that behaviors and psychological characteristics that promote survival and reproduction will be passed on to future generations. David Buss and others have published a number of studies that highlight how this perspective can aid our understanding of hunger, fear, and sexual motivation.

According to the evolutionary perspective, our primary goals are survival and reproduction. An example of a prediction that stems from this perspective is that although everyone has these same goals, attempts to attain them may lead to different behaviors in males and females. According to Buss, because females can have a limited number of children, females' best strategy is to invest heavily in each child and to find a mate who will provide resources for her and the children to ensure their survival. Males, on the other hand, can have an unlimited number of children (at least theoretically) and would be best served by mating with as many females as possible, maximizing the number of their offspring.

Although controversial, there is a burgeoning body of evidence that provides support for this perspective. Across cultures, there are indeed clear and consistent differences between males and females in their mating behavior. Buss has found that females do tend to seek out older males who will be able to provide more resources, whereas males tend to look for younger, attractive females with whom to mate. Youth and attractiveness are both perceived by males as correlates of an increased probability of successful reproduction, and it is in males' best interests to find women who have the greatest potential of successfully bearing children. This perspective is not without its critics, who point out the powerful role social factors play in motivating behavior. In support of this, Alice Eagly has found that in cultures without gender stereotypical roles, males and females tend to adopt similar mating strategies.

Intrinsic Motivation

Although there is appeal in theories that explain human behavior solely in terms of survival motives, it is important to consider that not all behaviors aim to reduce these basic human drives that directly promote our survival. Behavior marked by curiosity or play, for example, stumped drive theorists because these behaviors did not appear to reduce any of the four drives. As a result, researchers undertook the study of intrinsic motivation. This type of motivation is marked by a desire to take part in an activity purely for its own sake, as opposed to extrinsic ends such as money, rewards, or praise. Intrinsically motivated activities (which vary widely across individuals) are those activities that one would freely choose to engage in on a day off and are pleasurable, inspiring, and involving.

Personality Psychology

Another internal source of motivation, and one that is constantly affecting our motivation, stems

from the web of personality traits we possess. Personality psychologists examine the structure of personality and the behaviors that correlate to personality traits. The five-factor model of personality proposes that all personality traits fit into one of the following categories: openness to new experience, conscientiousness, extraversion, agreeableness, and neuroticism. Each of us has a personality that is a unique combination of these five factors. What is important in the study of motivation is to consider how these personality factors interact with each other and with environmental factors to help us predict an individual's motivation.

Clearly, all of these internal sources of motivation can be related to one another. Our genetic makeup contributes to our personality, our personality influences the extent to which we engage in intrinsically motivated activities, and so on. Thus, one may be predisposed genetically to take risks, and this predisposition may subsequently lead to the development of an intrinsic motivation for skydiving. Taken together, all of these internal sources of motivation can be powerful predictors of behavior.

EXTERNAL SOURCES OF MOTIVATION

The nature-nurture question in psychology emphasizes that external sources of motivation also play an important role in motivated behavior. It is generally accepted that changes in one's environment affect motivation. Whether it is a student working for a grade, a salesperson trying to earn a commission, or a child cleaning up the kitchen to receive praise from parents, external factors clearly affect motivation. Whether these environmental factors affect motivation positively or negatively is a more complex issue.

THE INTERACTION BETWEEN INTERNAL AND EXTERNAL FACTORS

Recall that to predict behavior, one must consider both internal and external factors, as well as the potential interaction between these two broad sources of motivation. For example, take the use of rewards as motivators. Most young children have been offered rewards for behaviors such as eating their vegetables, reading books, or being quiet at the appropriate time. Are these rewards effective? The answer appears to be yes and no.

Do rewards work in the short term? Absolutely. Offer a child a candy bar to be quiet for 5 minutes and there is a good chance the child will become silent. Offer a third grader a pizza party for reading 10 books and the books will be read (assuming the child likes pizza). However, although rewards may sufficiently motivate individuals in the short term, they may be less effective in the long term, particularly when the reward is no longer available. Will that same student freely choose to read over the summer, when there is no chance of a reward?

To explore this question, Mark Lepper and his colleagues conducted a classic study that demonstrated the danger of providing an external reward for a behavior that is already intrinsically motivated. Children who were promised a reward for drawing a picture with magic markers (an activity they found enjoyable) were subsequently found to be less likely to play with the markers on their own than children who were not rewarded. Children who were offered a reward saw their behavior as a means to an end, rather than as an end in itself. Thus, when an activity is enjoyable, external controls (e.g., rewards, money, and even praise) may be successful at producing the desired response in the short term, but harmful to long-term motivation.

THE REWARDS CONTROVERSY

Rewards continue to be a hot topic in schools, with parents, and in the workplace. Recently, separate teams of researchers have published meta-analyses that provide different accounts of the potential benefits and drawbacks of rewards. This rewards debate becomes even more complex when one considers that rewards can take on many different forms. They may be given simply for engaging in a task (task-contingent reward) or for completing a task with a high level of quality (performance-contingent reward). Other research has examined the motivational effectiveness of unexpected compared with expected rewards. Finally, consider the dilemma of a teacher tempted to use rewards while working with a student who simply does not like to read. In this case, an external reward may be one method of initially motivating the student to read, with the hope that the student will eventually develop intrinsic motivation for the task.

Although the results of these meta-analyses are somewhat discrepant, overall rewards appear to have their most negative effects when they are (a) task

contingent, (b) tangible, (c) expected, and (d) offered to an individual who already has a high level of intrinsic motivation. As a result, rewards may be a double-edged sword, proving very effective at motivating in the short term, but discouraging intrinsic motivation over a longer period of time.

SUMMARY

Motivation helps initiate, guide, and regulate our behavior and is involved in all of our actions. The challenge of the study of motivation is that humans are incredibly complex individuals, and a consideration of internal and external factors is necessary to understand the motivation behind behavior. As we reflect back on the examples of the student eating in the cafeteria and the athlete playing basketball, they demonstrate that to understand motivation, one must consider a complex web of physiological, psychological, and environmental factors.

—John M. Tauer

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MOTOR SKILL MASTERING

Motor skill mastery refers to developing the ability to move and control the body. Motor skills acquisition is an important development achievement because it affords individuals independence through the exploration of space, objects, and people in the environment. For psychologists, the development of motor skills has important cognitive and social consequences. The child who draws with a pencil is manipulating a tool to convey thoughts or express emotion. Motor skills are important in early schooling. For example, educators provide materials, such as tweezers, paintbrushes, and string, to help children refine the pincer grip, which enables them to manipulate objects between the thumb and fingers.

Skilled movements require the use of visual and tactile sensations to monitor ongoing movements and plan upcoming action. At the fine motor level, control of actions requires postural adjustments and small, precise movements, such as coordinating the fingers with the eyes when tying shoelaces. At the gross motor level, execution of actions is a coordinated sequence of large body movements, such as walking up steps or throwing a ball. Gross motor skills enhance fine motor skills and vice versa: a child who sits steadily can manipulate objects bimanually, while a child who grasps supportive objects can engage the leg muscles to pull to standing.

As summarized in Table 1, the forms and emergence of motor milestones in early childhood show a similar sequence and time course. The orderly acquisition of motor milestones led pioneers in motor development research, such as Arnold Gesell, to believe that motor skills developed from genetically programmed responses controlled by neurological maturation of the brain. Current views of motor development, such as that of Ester Thelen, not only emphasize the confluence of brain, muscular, and skeletal systems, but also assert that mastering motor skills involves visual perception, balance, bodily proportion, and motivation. Instead of unfolding from a preprogrammed maturational plan, motor skills develop as individuals actively reorganize existing motor capabilities into novel and increasingly complex actions that help meet their objectives and needs.

The chronology of motor milestones is largely uniform across individuals, especially infants and toddlers, because motor behaviors arise as optimal

Table 1 Age Norms for Gross and Fine Motor Skills Mastered During Infancy and Toddlerhood

Motor Skill	*Age in Months*
Lifts head 90 degrees when lying on stomach	2.2
Rolls over	2.8
Reaches and grasps objects	3.5
Sits without support	5.5
Stands holding on	5.8
Transfers objects between hands	6.0
Walks holding on	9.2
Stands alone well	11.5
Points to objects	11.5
Walks well	12.1
Plays pat-a-cake	15.0
Walks up steps	18.0
Builds tower with two block cubes	13.0
Kicks ball forward	20.0

responses to solving practical problems with similar constraints. For instance, reaching and self-locomotion are prompted by infants' desire to grasp and explore objects. Constraints that infants must consider to accomplish this task include the trajectory of their reaches to target objects and characteristics of surfaces that they must traverse to get to objects they want. Variability, flexibility, and perseverance in practicing movements advance motor skills in naturally occurring problems that youngsters encounter.

The onset of walking, which varies between cultures, illustrates why motor milestones are age related rather than age dependent. West African and West Indian caregivers place infants in supportive holes in the ground to encourage sitting and rigorously massage infants' extremities to strengthen their muscles. Unassisted sitting and walking occur several months earlier in these babies compared to those in the United States and Europe. Crawling appears sooner in Western babies compared with those in Africa and China. African caregivers discourage crawling because it is viewed as dirty and potentially dangerous, while Chinese caregivers' practice of placing infants on soft beds with pillows slows the development of the upper trunk and arms, which are necessary for crawling.

Standard tests of motor skills, such as the Bayley Infant Scales of Motor Development, are available in infancy. Assessment of motor skills, including stringing beads, using food and writing utensils, and cutting with scissors, continues throughout the school years. Impaired motor functioning in early childhood, such as delays or clumsiness, may signal cerebral palsy, while ambiguous handedness may indicate a developmental disability such as autism.

Adolescents and young adults, with their increased strength and coordination, are evaluated in areas requiring many forms of movement, such as sports, music, and art. In adulthood, integrating thoughts with action becomes automatic and routine and, as a result, movement reaction time speeds up. In middle adulthood, reaction time slows and movements become more challenging to execute. Continued physical activity in adulthood is the single most important contributor to maintaining health and psychological well-being because exercise slows the erosion of muscle strength and loss of bone density, while improving cardiovascular and digestive functions.

—Julie S. Johnson-Pynn

See also Physical Development and Growth

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MOZART EFFECT

In 1993, the scientific journal *Nature* announced that listening to 10 minutes of the Mozart *Sonata for Two Pianos in D Major* (K. 448) would cause subsequent enhancement in reasoning lasting 10 to 15

minutes. These studies with college students demonstrating that music can causally enhance thinking in patterns—coined the "Mozart effect" by the media—created worldwide interest, as well as some exploitation and confusion. The research has been greatly generalized and now comprises a number of supportive studies, done in different labs with different perspectives and techniques. These results plus brain theory predictions are considered together in order to address all aspects of this important field of high interest. Relevant Mozart effect (gMe) studies include Alzheimer's disease, epilepsy, animal models with rats and with mice, and (electroencephalographic [EEG] and functional magnetic resonance imaging [fMRI]) brain imaging. They demonstrate the reality and importance of the gMe, although full understanding and consequences remain to be determined.

Spatial-temporal (ST) reasoning—thinking in patterns—is forming a mental image and thinking steps ahead, as in chess. Brain theory studies led to the prediction that music would resonate with and enhance the inherent firing patterns in the cortex used in ST reasoning. The initial (short-lasting) Mozart effect listening studies with college students are sometimes confused with the studies showing that 6 months of piano keyboard training causally enhanced ST abilities in preschool children, lasting more than 3 days after the last lesson. The bases of the gMe are being revealed in brain imaging (EEG and fMRI) studies. These studies indicated that exposure to the Mozart sonata enhances higher brain function. Other studies indicated a normalizing effect in the neuropathologies of Alzheimer's disease and epilepsy. In the case of epilepsy, exposure to the Mozart sonata dramatically reduced neuropathological spiking activity in most subjects, even those in coma.

It was expected that the music of Mozart would resonate with our structured brain since he was composing at the age of 4 and could write down an entire piece without changing a note. The specific Mozart sonata (K. 448) was expected to enhance ST reasoning because of its brilliant patterns and symmetry. Presumably other music (by Mozart and other composers) besides the Mozart sonata (K. 448) will be found giving analogous enhancement in gMe studies.

An animal model was found for the gMe. Intensive long-term exposure of rats to the Mozart sonata before and after birth resulted in enhanced ability to master a spatial maze. The effect lasted at least 4 hours after exposure to the music. A mouse study has verified and expanded on the rat study in important aspects: no exposure of the animals before birth to music; the effect after music exposure is extended to 6 hours; the "popular" classical Beethoven's *Für Elise* was used as a control since it did not give a gMe in fMRI studies. These mouse and rat studies have major potential noninvasive clinical relevance in treatment of epilepsy and Alzheimer's disease.

It has been suggested that emotional, cultural, attention, music preference, or peer pressure factors may play roles in the gMe in the college student studies. The rat and mouse studies, as well as the epilepsy study where some of the human patients were in coma, rule against this.

The gMe holds great promise, although much work remains; there is no direct research showing that listening to music will make your infant smarter. Thus, you might buy any classical CD (e.g., the Mozart sonata) to play (in moderation) for your child instead of CDs and videos claiming great results.

—Gordon L. Shaw

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MULTIPLE BIRTHS

The incidence of multiple births is an increasing occurrence in the lives of many families. When two or more fetuses are carried simultaneously and delivered

by a woman, it is termed a multiple birth. When two infants are delivered together, they are called twins, three are called triplets, four are termed quadruplets, five are labeled quintuplets, six are called sextuplets, and seven are septuplets. Multiple births of more than twins and triplets are usually referred to as higher-order multiple births or "supertwins." There are currently only 25 sets of surviving sextuplets in the world, and only 9 in the United States.

Most multiple births are twins. In 1997, 94% of multiple births reported were twins. The numbers of twin, triplet, and higher-order multiple births have climbed at an unprecedented rate over the past 20 years. Between 1980 and 1997, the number of live births in twin deliveries has risen by 52%, while the number of triplet or higher-order births has risen 404%. By contrast, singleton births, or one baby delivered alone, rose only 6% during this time.

Twins referred to as identical, or paternal (also known as monozygotic), are derived from a single fertilized egg. During fertilization, one ovum (or egg) is impregnated by one sperm. Afterward, the egg divides into two separate embryos. Each embryo has the same chromosomes, they are identical in appearance and are always the same sex. Nonidentical, or fraternal, twins (also known as dizygotic) are more common and are derived from the development of two different eggs that are released from separate follicles at about the same time. They are fertilized by two different sperm and become implanted in different places in the uterus. The embryos have different chromosomal makeups and may or may not be the same sex. Higher-order multiples can be a combination of fraternal and paternal embryos or one egg splitting several times.

Historical differences in the rates of multiple births between white and African American women have been eradicated because the increases in multiple births for white women have increased more rapidly than among blacks. The twin birth rate for Hispanic women is substantially less likely than for non-Hispanic white or African American women. Since about 1988, the rates for triplet or higher-order multiple births have increased at a much faster pace for white women than for non-white Hispanic or African American women.

There are several explanations for the increase in multiple births. The likelihood of multiple births increases steadily with advancing maternal age. A woman in her thirties has twice the chance of giving birth to fraternal twins as her counterpart 10 years younger. Improvements in the early detection of multiple gestations through the use of ultrasound techniques, improved prenatal care, and medical advances in the care of neonates have increased the survival rate of multiple-birth infants. Advances in infertility treatments have also contributed significantly.

There are significant risks involved with multiple births, and these risks increase exponentially with higher-order multiples. All multiple pregnancies are automatically considered high risk. Twins are 8 times and triplets and higher-order multiples 33 times more likely than singletons to be born at a weight of less than 1,500 grams, or very low birth weight (VLBW). More than one half of all twins, and nearly all triplet or higher-order multiples, are born with low birth weight (LBW) (less than 2,500 grams). This compares with only 6% of singletons born with LBW. Additional risks for the infants include prematurity, underdeveloped lungs, cerebral palsy, hearing or vision problems, developmental delays, or learning disabilities. Risks for the mother include preeclampsia (a rapid rise in blood pressure, protein in urine, and fluid retention), anemia (low red blood cell count), preterm bleeding, preterm labor, gestational diabetes, and miscarriage. Families of multiples face increases in financial burdens, marital stress, child care issues, and a multitude of other adjustments. As would be expected, the higher the number of multiple births, the greater the adjustment. As the number of multiple births continues to increase, many more families are facing such challenges.

—Mary P. Gass

See also Twin Studies

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MULTIPLE INTELLIGENCES

Multiple intelligences represent expanded or broader views on the concept, definition, and assessment of intelligence. Few of the fields are as controversial as the field of intelligence. In Sternberg's analysis, different views on intelligence result not only from ideological biases affecting theoretical positions, but also from what defines the concept of intelligence. A major current trend is the expansion of the concept of intelligence, which is evidenced in the continuing heated debate about the unitary versus multiple nature of intelligence. This debate, rooted in the earlier controversy between Spearman and Thurstone about the nature of general versus specific abilities, continues to this day. The psychologists who are proponents of the unitary nature of intelligence, referred to by Sternberg as "traditionalists," believe that there is only one form of intelligence (usually equated to Spearman's g, or a general intelligence factor), that intelligence is primarily inherited and thus fairly immutable, that individuals are born with a certain degree of intellectual potential, and that the individual's intelligence can be assessed using some kind of an intelligence test. In contrast, a growing number of theorists in the individual differences tradition, referred to by Sternberg as the "revolutionaries," have proposed theories that challenge the conventional unitary concept of intelligence. Many theorists now agree that intelligence is not a unitary concept—that it is not one thing but many things—and, therefore, single and narrow definitions cannot be used to explain this multifaceted phenomenon. Von Karolyi, Ramos-Ford, and Gardner, in 2003, wrote, "In these rival versions, intellect is seen as having several, at least partially, dissociable aspects; the primacy of g is questioned; the mutability of intelligence is asserted or at least probed and a much broader range of assessments is endorsed" (p. 100). The controversy and inconclusiveness surrounding present theories of intelligence has led J. P. Guilford, Howard Gardner, Robert Sternberg, and Joseph Renzulli to develop new, broader models explaining this complex concept. These theorists believe that by "casting a broader net," we can help more children with different kinds of talents and gifts realize their full potential.

Of note is that, historically, the study of intelligence, particularly the arguments surrounding issues related to the dimensionality, assessment, heritability, and stability of intelligence, as well as the definition, meaning, implications, and applications of the construct, has closely paralleled the study of giftedness. Many scholars who studied intelligence—Francis Galton, Lewis Terman, and Leta Hollingworth being among the major influences—also studied manifestations of talent, giftedness, and genius. Many of the most profound influences of the intelligence theory have been long observed in the field of gifted education. Renzulli and Reis explained that it was within the context of the enrichment programs for the gifted and talented that the pioneering work on intelligence of notable theorists such as Gardner and Sternberg first gained the attention of the education community. Renzulli's identification and programmatic models in gifted education are firmly rooted in the broader theories of intelligence and giftedness. In sum, intelligence theory influences identification and assessment of gifted students, attitudes to gifted students, the models upon which programs and interventions are based, and many other aspects of gifted education. Four of the most prominent broader theories of intelligence and giftedness will be considered. First, each of these theories is briefly described. Second, an overview of the assessments associated with each of the theories is presented. Third, these theories are compared and differences as well as similarities are highlighted. Finally, the applied importance of these theories is summarized.

AN OVERVIEW OF THE VARIOUS MODELS OF MULTIPLE INTELLIGENCES

The four most recognized and widely known theories and models will be discussed, in particular those of Guilford, Gardner, Sternberg, and Renzulli. These theories were largely chosen because they represent a multidimensional, comprehensive view of intelligence; most of them have been implemented in a variety of settings; they have demonstrated, in varying degrees, empirical support; and they have laid the foundation for numerous innovative applications in educational settings.

Guilford's Structure-of-Intellect Model

Guilford's in many ways pioneering work on the structure-of-intellect (SOI) model has served as a precursor to the modern complex multidimensional theories of intelligence and giftedness, in particular,

those of Gardner, Sternberg, and Renzulli. He developed a three-dimensional taxonomy that allowed him to classify any test in terms of its position along the unique interface of three dimensions of the "cube" (i.e., operation, content, and product). Each type of content can be matched with each operation or product to form a separate cell of the model or a particular intellectual ability. Guilford's initial model was composed of 120 intellectual factors or abilities, which was later extended to 150 and then to 180 cells. In particular, the model is composed of six operations (cognition, memory recording, memory retention, divergent production, convergent production, and evaluation). Each of these operations can be brought to bear on any of the five types of contents (visual, auditory, symbolic, semantic, and behavioral). The application of the operations (or processes) to contents results in one of the six types of products (units, classes, relations, systems, transformations, and implications). Guilford identified components of divergent production that have created the foundation for the contemporary research and assessment of creativity described later.

Gardner's Theory of Multiple Intelligences

Gardner's Theory of Multiple Intelligences (MI) added strong momentum to the movement to broaden our views on intelligence. He has presented an "alternative vision" based on a radically different view of the mind. His extremely popular theory is a reflection of a more pluralistic view of the mind, which recognizes that many different and discreet facets of cognition exist, and which acknowledges that people have different cognitive strengths and cognitive styles. In his view, an architect is intelligent in a certain way that is different from a musician or an athlete. Gardner defines intelligence as a biopsychological potential to process information in certain ways. Intelligence permits an individual to solve problems and create products that are of value within a cultural context, and each intelligence can be activated in an appropriate cultural setting. In his recent work, Gardner and his colleagues emphasize the difference between separate intelligences (or psychosocial potentials) and domains (cultural concepts) in which the intelligences can be cultivated.

Initially, Gardner distinguished between seven relatively autonomous intelligences, and later he added the eighth intelligence: linguistic (comprehension and expression of written and oral language), logical-mathematical (computation, deductive and inductive reasoning), musical (pitch, melody, rhythm, texture, musical themes, harmony), spatial (design, color, form, perspective, balance, contrast), bodily-kinesthetic (control and coordination, balance, locating self or objects in space), interpersonal (ability to inspire, instruct, or lead others and respond to their actions, emotions, motivations, and situations), intrapersonal (knowledge and understanding of one's strengths and weaknesses, styles, emotions, self-orientation), and naturalist (noting the differences that are key to discriminating among several categories or species of objects in the natural world). Although Gardner initially conceptualized the intelligences as fairly independent, he also recognized that they are fairly interactive. Another theory based on the pluralistic, broader view of intelligence is that of Sternberg, which is described next.

Sternberg's Successful Intelligence Theory

Years of theorizing and empirical testing led Robert Sternberg to the development of his theory of successful intelligence (SI). In 2002, Sternberg and Grigorenko defined successful intelligence as "the ability to succeed in life according to one's own definition of success, within one's sociocultural context, by capitalizing on one's strengths and correcting or compensating for one's weaknesses; in order to adapt to, shape, and select environments; through a combination of analytical, creative, and practical abilities" (p. 265). The theory of successful intelligence is composed of three subtheories: (a) componential subtheory dealing with the components of intelligence with focus on information processing, including metacomponents, performance components, and knowledge acquisition components; (b) an experiential subtheory dealing with the importance of coping with relative novelty and situational demands and automatization of information processing; and (c) a contextual theory dealing with processes of purposive adaptation and shaping and selection of real-world environments. As Sternberg explained, this theory has been referred to from time to time as the triarchic theory of intelligence. An individual who has strengths in the componential subtheory area is likely to score highly on traditional IQ tests. A person with strengths in the experiential subtheory area would be regarded as more creative. A person

with strengths in the contextual subtheory area would be most likely to succeed in academic and professional arenas through the application of tacit knowledge. As a consequence, the three components of intelligence (componential, experiential, and contextual) are translated into the three broad kinds of abilities: analytical, creative, and practical. In Sternberg's description, an individual must have analytical abilities to analyze and evaluate the available options. Among such abilities are identifying the existence of the problem, creating a strategy for solving the problem, and monitoring one's solution process. In order to generate problem-solving options in the first place, an individual needs creative abilities. According to Sternberg and Lubart's investment theory of creativity, creative people are those who "buy low and sell high" in the world of ideas. Research shows that these abilities are at least partially distinct from conventional IQ, and that they are moderately domain specific, which means that if an individual is creative in one domain (such as art), that individual may or may not necessarily also be creative in another domain (such as writing). Practical abilities are called for when one needs to implement ideas and make them work; in other words, these abilities are involved when intelligence is applied to real-world contexts. An important aspect of practical intelligence is the acquisition and application of tacit knowledge, which is knowledge of what one needs to know to succeed in a particular environment that is usually not explicitly taught or verbalized. To become successful, an individual needs to cultivate a combination of all three abilities.

Renzulli's Three-Ring Conception of Giftedness and the Schoolwide Enrichment Model

As posited above, the history of theorizing about intelligence and giftedness has been intertwined since the beginning of the 20th century. One of the most popular broadened definitions of giftedness is the three-ring conception developed by Joseph Renzulli, in which giftedness consists of an interaction among above-average general ability, high levels of creativity, and high levels of task commitment. Renzulli distinguished between "schoolhouse" giftedness and "creative-productive" giftedness. Schoolhouse giftedness is a lesson-learning or test-taking giftedness, which is most often measured by IQ or other cognitive ability tests, and which is highly valued and rewarded in traditional learning environments. In contrast, creative-productive giftedness describes giftedness in the generation of creative ideas and fashioning of the original products. Renzulli and Reis emphasized that both types of giftedness are important, that usually these two types are interactive, and that educators should provide gifted and talented students with programs that foster the development of both kinds of giftedness as well as the interaction between them. Renzulli's recent work on expanding his conception of giftedness, known as "Operation Houndstooth," includes a scientific examination of a more focused set of background components or co-cognitive traits, which was earlier represented by a houndstooth pattern background of his original three-ring model. These co-cognitive traits used to promote social capital are optimism, courage, romance with a topic or discipline, sensitivity to human concerns, physical/mental energy, and vision/sense of destiny. In Renzulli's conceptualization, a better understanding of people who use their gifts in socially constructive ways may help educators and psychologists to create conditions that expand the number of people who contribute to the growth of the society's social capital.

The three-ring conception of giftedness, which characterizes creative productive giftedness, serves as part of the rationale for Renzulli and Reis's programmatic approach in gifted education. Rather than labeling a child as either "gifted" or "nongifted," they emphasize the development of gifted performances or gifted behaviors, which can be developed through systematic enrichment opportunities described earlier in the enrichment triad model, and which later evolved into the schoolwide enrichment model (SEM). The SEM is a research-supported, detailed blueprint for total school improvement that helps schools to create a repertoire of services in such a way as to create, in Renzulli and Reis's description, a "rising tide lifts all ships approach." Although this model is based on highly successful practices that had originated in special programs for gifted and talented students, its major goal is to promote challenging and enjoyable high-end learning across a wide range of school types, levels, and demographic differences.

ASSESSMENT APPROACHES

Guilford's Divergent Thinking Assessments

Guilford dedicated three decades to developing tests measuring the 180 abilities represented by his complex SOI model. Guilford's conceptualization of

creativity as a subset of intelligence—as evidenced in his inclusion into the SOI model of "divergent thinking," or thinking of many responses to a given question—served as the foundation for his work on tests assessing divergent thinking. Guilford's tests, which emphasized divergent production and transformations, include the Unusual Uses Test and Creativity Tests for Children. The latter are composed of five verbal and five nonverbal divergent production tasks, for instance, creating names for stories, finding letters of the alphabet hidden in complex figures, and listing alternate uses for familiar objects. Guilford's creativity tests were criticized because of low reliability estimates, low correlations with the Torrance Tests of Creative Thinking (TTCT), and lack of correlation with other measures of divergent thinking. It is generally agreed that the second generation of creativity tests (particularly, the TTCT) has surpassed Guilford's original measures of divergent thinking in terms of validity and reliability.

Gardner's Approach to Testing and Assessment

Why is it important to assess intelligence? Gardner believes that all children are entitled to a personalized education that takes into consideration their strengths and weaknesses as well as their interests and needs. As a consequence, in order to find the information needed to individualize their education, it is necessary to assess their intelligence. There have been several instruments and assessments developed in the MI tradition, but more reliability and validity studies are needed. How does one assess intelligence? If you are like Gardner, you will believe that the answer will vary depending on the intelligence theory in question. Each of the intelligence theories discussed here views assessment somewhat differently. At this time, Gardner does not have an instrument that measures each intelligence. The development of such a test would, essentially, be contrary to the foundation of his theory. In reference to assessing intelligence, Gardner and his research group posit that assessments must be "intelligence-fair." This means that the assessment given should measure a specific intelligence and should not confound intelligences. For example, if you were to assess a student's musical intelligence, the assessment may involve playing an instrument. In this situation, a written assessment is not appropriate. In Gardner's view, assessment does not have to be standardized. A teacher may also assess students' intelligence by observing their performance in the classroom, and in these instances, their intelligence is observed in their natural state. Appropriate assessment may also be achieved in a formal setting, but Gardner and his colleagues advise that evaluations will be most informed and useful when they occur in authentic working situations. In this case, assessing a child's social understandings by observing classroom interactions also has much more ecological validity.

Sternberg's Triarchic Abilities Test Viewed as Part of a Comprehensive Assessment System

Sternberg and his colleagues believe that IQ tests and their equivalents can provide only one among several useful bases for identification and, more broadly, for assessing an individual's intellectual potential. They acknowledge that these measures may provide some useful information about children's analytical abilities valued in traditional school settings. However, they say little or nothing about children's creative and practical abilities, which are linked to later success and satisfaction in life. Sternberg's Triarchic Abilities Test (STAT) measures analytical, creative, and practical skills. The test has been significantly improved from its original version criticized by Brody, and it has demonstrated outstanding internal and external validation properties in more recent studies. As described by Sternberg and Grigorenko, the first edition of the test has two levels: one for grade 4 and another for high school. It measures the three triarchic abilities in each of the verbal, quantitative, and figural domains, using multiple-choice items and the essay domain. This earlier version of the test was paper-and-pencil format and was composed of 12 subtests. Sternberg and his research group have created a more recent edition of this test, which is administered via the Internet. This test supplements the original measures of creative and practical abilities with performance-based assessments. For example, creative abilities are additionally measured by having students write and tell short stories or provide captions for cartoons and having them use computer software to design a variety of products such as greeting cards and a company logo. Practical skills are also measured by solving everyday problems presented in films and by an everyday situational judgment inventory and a college student tacit knowledge inventory. Sternberg and Grigorenko recommend using the STAT as part of a comprehensive assessment system in terms of the theory of successful intelligence.

Renzulli's Multidimensional Approach to Assessment

Striving to find out the best things about the students to develop their potential and creative productivity are the major tenets of Renzulli's dynamic, comprehensive, and research-based talent pool assessment system, which is more inclusive of diverse gifted and talented students. In his empirically tested identification and programmatic models, identification methods, instruction, and assessment must all match as evidence of the internal consistency among all three components. If you are like Renzulli, you believe that, instead of measuring student success solely in terms of test scores, gains in test scores, and skills mastery, we should define student success simply as opportunities to participate in a continuum of high-end learning activities. This approach should also serve as the ultimate criteria for determining the success of a school as a total.

As described by Renzulli and Reis, in the SEM, a talent pool of 15% to 20% of above-average/high-potential students are identified in a school using a variety of measures, including achievement and IQ test scores, teacher nominations, creativity tests, assessments of students' products and student task commitment, as well as "alternate pathways" of entrance (such as parent nomination, student nomination, etc.). Once students are identified for the talent pool, they are eligible for three types of services. First, interest and learning style assessments are used with talent pool students, and various methods are used to identify students' interests and to encourage students to further develop and pursue these interests in many different ways. This information, which focuses on students' strengths rather than deficits, is compiled into a so-called total talent portfolio, formatted in a folder, which serves as a systematic vehicle for gathering, recording, and making decisions about talent development for students. Renzulli and Reis's approach to targeting learning characteristics and developing talents in all students uses both traditional and performance-based assessments to collect information about the three dimensions of the learners—abilities, interests, and learning styles. Second, curriculum modification, referred to by the model developers as curriculum compacting, may be provided to all eligible students for whom the regular curriculum is modified by eliminating previously mastered content. Third, three types of enrichment experiences are provided based on the enrichment triad model, a theoretical approach underlying the SEM. The overarching goal is to develop talent potentials in all students and to foster creative productivity in young people by exposing them to various topics, areas of interest, and fields of study and to further train them to apply advanced content, process-training skills, and methodology training to self-selected areas of interest. In the SEM, types I (general exploratory activities), II (training in methodology), and III enrichment (pursuit of a self-selected area at an advanced level of involvement and creation of new products) are offered to all students. Type III, however, is usually more appropriate for students who demonstrate higher levels of ability, interest, motivation, and task commitment.

COMPARISON OF THE FOUR MODELS

In examining the models of Guilford, Gardner, Sternberg, and Renzulli, it quickly becomes apparent that these models have both differences and similarities. Even though differences can be distinguished on several levels, including the dimensionality of the models, the way the dimensionality is addressed in each particular theory, the conceptualization of the role of assessment, the existence of reliable and valid instrumentation, and the extent of empirical validation, there exist sufficiently profound similarities among the models to view them as basically complimentary on a deeper level. It should be noted that, because of space limitations, this analysis is not intended to be exhaustive.

The degree to which the diversity of opinion on the dimensionality of intelligence has had an impact on theory and practice in the field of gifted education is exemplified by the intelligence theories of Guilford, Gardner, and Sternberg. As described earlier, Guilford initially specified 120 components of intelligence. In his MI theory, Gardner initially specified seven intelligences, a count that was later extended to eight intelligences. In his successful intelligence theory, also known as the triarchic (three-part) theory, Sternberg postulated that, in addition to analytical abilities, we also need to assess and develop creative and practical abilities. Interestingly, in commenting on the impact of MI theory, Gardner speculated that his MI theory probably would have been ignored in both educational and psychological circles if, like Guilford, he had postulated the existence of 120 or 150 different intelligences. Renzulli has advanced a widely popular conception of giftedness, which includes three interlocking

clusters of above-average ability, creativity, and task commitment. He recently focused on how we can develop co-cognitive traits and create conditions conducive to the development of creative productivity and social capital in young people.

As far as how the dimensionality of intelligence is addressed, Guilford conceptualized his initial 120 intellectual abilities along the dimensions of content, process, and product. Gardner proposed that intelligence is multidimensional, but he addressed multidimensionality across the areas of human performance, and made the distinction between intelligences and domains in which intelligences can be activated or manifested. In comparing Guilford's theory to that of Gardner, Sternberg and Grigorenko pointed out that the theory of multiple intelligences and the successful intelligence theory are essentially complimentary in that Gardner's MI theory specifies domains in which intellectual gifts may operate, whereas the SI theory specifies kinds of processes. In addition to positing the nontraditional kinds of intelligence, Sternberg also emphasized the importance of one's ability to compensate for weaknesses and develop strengths, as well as the ability to match one's strength areas with the tasks one chooses to perform and opportunities one elects to pursue. Callahan observed that Gardner's theory has been criticized for presuming independence of categories, whereas the theories of Guilford and Gardner are criticized for presuming a fixed set of abilities.

With regard to assessment, even though the differences among the four theories may appear as more pronounced, there are also some indisputable similarities. Guilford and Gardner could probably be positioned at the opposite ends of the testing-assessment continuum: Whereas Guilford spent over three decades developing tests for all of the SOI abilities, Gardner implied that developing an instrument to assess each of the eight intelligences would essentially be contrary to the foundation of his MI theory. In Callahan's analysis, even though Gardner has acknowledged the interrelationships among the intelligences, others' interpretations of the MI model for defining giftedness and identifying gifted children have presumed independent categories. In addition, analyses of assessment tools designed in the MI tradition have not validated their use for identification of independent categories of giftedness. Gardner, Sternberg, and Renzulli all concur with the importance of making a distinction between testing, which represents a narrow slice of the individual's abilities, and assessment, which serves as an ongoing process of reflection and observation that works with a well-designed curriculum and takes place in a meaningful context. More generally, the three theorists agree that identification, instruction, and assessment must all match.

With respect to the empirical testing of the theories, substantial differences exist among the four models. Except when implemented by some of Guilford's students in the field of gifted education, Guilford's SOI model has been somewhat ignored in educational circles. Gardner's theory has been implemented in many educational settings, but more empirical validation of the theory and more reliable and valid instrumentation are needed. Sternberg's theory has not caught on in educational settings as much as Gardner's theory did, but recent developments, particularly its applications in gifted education, are very promising. Sternberg and his colleagues have published several validity studies of the SI theory, with positive results. Renzulli's identification and programmatic models could be seen as most widely implemented and tested in a variety of educational settings.

In sum, despite differences among these broader theories, they all challenge traditional narrow formulations of intelligence. All theorists concur that intelligence is not a single or fixed trait, that intelligence is teachable and modifiable, that intelligence is culture dependent, that intelligence involves both internal and external factors, and that the individual's inherited intellectual potential is activated, developed, or hindered by the individual's interaction with the environment.

APPLIED IMPORTANCE OF THE BROADER THEORIES OF INTELLIGENCE

It is challenging to describe the importance of these complex and multidimensional models in detail; thus, only some of the major highlights are presented here. Guilford's work in many ways has served as a precursor to the development of the more recent broader theories of intelligence, particularly those of Gardner and Sternberg, and his work also had an impact on Renzulli's broadened conception of giftedness and talent development programmatic models. He was the first who called attention to the idea that there are important dimensions of human capability that are not measured by intelligence tests. One of the most lasting impacts of Guilford's model was his conceptualization of the divergent production slab in his SOI

model. Guilford identified the components of divergent production that laid the groundwork for much of the present-day research and assessment of creativity.

In assessing the influence of Gardner's work, Sternberg, Lautrey, and Lubart, in 2003, eloquently explained, "Gardner's model has had enormous impact on education—perhaps more impact than any other theory that has ever preceded it. Thus, the model is a testament to the power that psychologists can wield to change science and society when they come up with a set of ideas that captures the scientific and public imagination" (p. 12). Despite the criticisms, which are practically unavoidable in the case of a widely popular model, the impacts of Gardner's work are many, varied, and wide ranging. In Gardner's own description, the MI theory has had impact on several levels. For example, on the conceptual level, the theory insists not on domination by a single-level construct of intelligence, but rather on a place for that construct on the continuum between the overall notion of general intelligence and the long list of specific skills and subskills. On the empirical level, it provides a more grounded and clear explanation for many groups and behaviors as compared to either the general or the local perspective. Gardner recognizes that, despite the inevitable misapplications, the theory provides the foundation for an education that can reach more students in a way that enhances their learning and deepens their understanding. Pedagogically, the MI theory has inspired diverse educational practices and programs, including Project Spectrum, Project DISCOVER, and others. As a provocation to think differently about assessment and education, Gardner's model continues to inspire diverse educational practices today.

For years, Sternberg has been the front-runner in the heated battle against overreliance on intelligence tests and other standardized tests as sole measures of human intellectual abilities and potential. Sternberg and his colleagues, in commenting on the complexity of systems theories such as his own, aptly noted that the complexity of systems models is "both a blessing and a curse" because it enables such models to recognize the multiple complex levels of intelligence, but it also makes these models much more difficult to test. Perhaps the complexity of such theories makes them more difficult to implement as well, because, on the whole, Sternberg's successful intelligence theory has not had as large of an impact on education as that of Gardner, primarily because of its complexity. However, Sternberg's theory has been gaining increasing acceptance in the field of gifted education, since it provides useful implications for identification, instruction, and assessment.

Last but not least, it can be argued that, of all the four major theoretical influences in the broader theories tradition described in this article, Renzulli's impact on gifted education has been the most substantial, far reaching, and enduring. He has uniquely combined theory and practice and has fostered a productive cross-fertilization of ideas among the modern theorists representing the liberal end of the continuum of ideologies in the field of intelligence and the field of gifted education. He is widely known nationally and internationally for his broader theories of giftedness and for his pragmatic and practical programmatic approach to talent development. The National Research Center on the Gifted and Talented (NRC/GT), also known as the Neag Center for Talent Development, which Renzulli is directing, is a collaborative effort among four universities, 54 state and territorial departments of education, over 350 collaborative school districts, 200 area content consultants, and multiple stakeholders. Renzulli's 1978 *Phi Delta Kappan* article describing his three-ring conception of giftedness has been the most widely cited publication in the field of gifted education. His schoolwide enrichment model has been the most widely used programmatic approach in the enrichment programs for gifted and talented students. With regard to the research base supporting the theory's effectiveness, Renzulli's models have been most widely empirically tested in diverse educational settings.

CONCLUSION

What do we gain by endorsing broader theories of intelligence and giftedness? Guilford, Gardner, Sternberg, and Renzulli would all agree that in the contemporary society as diverse and stratified as ours, "casting a broader net" to identify and nurture people's diverse potentials is imperative. As Renzulli and Reis observed, multiple talent and multiple criteria have become almost the bywords of the contemporary gifted education movement, and now most people have little difficulty in accepting a definition that includes most areas of human activity that are manifested in socially useful forms of expression. Similarly, even though there is little agreement in the field of intelligence, the trend is toward broader views on the definition, nature, and measurement of this complex construct. Perhaps on the more overarching level, all four models described here are essentially similar because they reflect broader

theories of intelligence, as evidenced in their foundational tenet that intelligence is not one thing but many; that intelligence is a complex, multifaceted, malleable, culture- and context-dependent phenomenon; and that we should strive to do everything in our power to develop the diverse abilities and potentialities in young people. Borrowing Renzulli's description, all of these models are at the liberal end of the continuum of ideologies. As Renzulli explained, the field of gifted education, as in the field of intelligence (or, for that matter, any specialized area of study), represents a spectrum of ideologies that exist from a continuum ranging from conservative (or most restricted) to liberal (least restrictive and more inclusive) points of view. Renzulli, Gardner, and Sternberg would all agree that, as the definitions of intelligence and giftedness are extended beyond those abilities that are measured by tests of intelligence, achievement, and academic aptitude, it becomes necessary to put less emphasis on the precise estimates of performance and potential and more emphasis on the opinions of qualified persons in making decisions about admission to special programs, or making other important decisions.

—Lilia M. Ruban and Clara A. Cantu

See also Emotional Intelligence; Gardner, Howard

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MULTIPLE SCLEROSIS

PATHOLOGY

Multiple sclerosis (MS) is a chronic inflammatory disease that affects neural connections within the central nervous system. In particular, the myelin sheath that covers nerve axons deteriorates and large plaques of demyelination appear. Additionally, there are indications that axonal tissue underlying the myelin sheath is damaged or transected. Ultimately, demyelination and axonal damage reduce electrochemical conduction between nerve cells. The mechanism of this inflammation is not entirely certain. Nonetheless, available evidence suggests that T-cell-mediated inflammation disrupts the blood-brain barrier as the myelin sheath is attacked. Cytokines, activated by the T-cell response, induce macrophages and microglia cells to enter the lesion site, and these cells ultimately result in demyelination. Deep white matter of the brain tends to be a common area of scarring associated with the disease. Cortical involvement is less apparent and less frequent. Macroscopic lesions associated with demyelination are commonly observed with magnetic resonance imaging (MRI). Multiple discrete lesions are disseminated over time and are frequently observed as cardinal diagnostic indicators of the disease.

ETIOLOGY

The etiology of the illness is uncertain, but is thought to be due at least in part to genetic influences. In particular, an increased familial incidence of MS has been recognized for over 100 years. However, objective evidence of genetic factors in MS has only recently been reported. Initial studies revealed that 15% to 20% of MS patients have an afflicted relative, and risk for developing the disease is higher among first- than second-degree relatives. Moreover, concordance of MS among monozygotic twins is significantly higher than in dizygotic twins. In adoption studies, adopted children were less likely to develop MS than were the biological offspring of a parent with MS. Thus, shared environment does not seem to contribute to development of the disease. Studies of molecular genetics suggest that the major histocompatibility complex and the human leukocyte antigen genes are commonly linked with MS. Certain ethnic groups also carry an increased risk for MS incidence, with whites of northern European descent having a higher incidence than other ethnic groups, including African Americans. Although such findings imply a significant genetic influence, a genetic explanation does not totally explain the etiology of the illness. For instance, concordance rates among monozygotic twins are not 100%. As such, environmental factors may contribute to disease onset. In this regard, numerous researchers have sought to identify infectious agents as disease vectors, but these efforts have met with limited success. Presently, there is little support for any single viral etiology for MS, although some researchers posit an etiology due to the effects of combined viral agents.

EPIDEMIOLOGICAL STATISTICS

The prevalence of MS varies according to latitude, with increasing rates occurring in locations more distant from the equator. In the United States, prevalence is estimated to range from 30 per 100,000 population in southern states to 53 per 100,000 in northern states. Similarly, incidence ranges from 6 to 14 per 100,000 population in southern states to 30 to 80 per 100,000 in the northern region. Women have a two to three times greater risk for developing MS than men.

DISEASE COURSE

Illness onset can occur at nearly any age, with cases having been reported in children younger than 10 and people older than 50. These extremely young and old ages of onset, however, are relatively uncommon. Onset tends to occur most commonly in individuals 20 to 40 years of age, with the late teen years being the next most common age of onset. Prognosis appears to be more favorable in those with an earlier age of onset, with a more rapid decline typical in individuals with age of onset older than 40. The course of the disease is highly variable, and four patterns have been defined. Some individuals show a primary progressive course of steadily worsening illness in the absence of acute attacks, and this occurs in 10% to 15% of people with MS. Others may show a relapsing-remitting pattern, and this is characterized by intermittent exacerbations that alternate with periods of no obvious disease activity. This appears in 80% to 85% of people with MS. Of those who present with a relapsing-remitting course, 50% to 60% will eventually develop a secondary progressive course. This, too, is characterized by intermittent exacerbations. Yet instead of returning to a baseline level of symptom remission between attacks, the person tends to deteriorate steadily between attacks. Patients with a progressive-relapsing course are relatively uncommon, and this occurs in fewer than 5% of cases. Such individuals display discrete attacks, but their disease course is marked by a steady deterioration from onset. Others show no clear disease course, and within individuals, the course of illness may change across time. Hence, there is no unitary estimate of life span after illness onset. Some individuals may have a particularly malignant course and die within a year of onset. Nevertheless, the average duration of illness is greater than 30 years.

SOMATIC SYMPTOMS

MS is manifest by a broad variety of symptoms, and this likely reflects the nonspecific loci of demyelinating lesions in the central nervous system. Most individuals display only a subset of symptoms, thereby giving MS a relatively varied symptom presentation. Sensory abnormalities occur in as many as 70% of patients, and they are among the earliest symptoms to manifest. Numbness, diminished sensation, pain, and/or paresthesias (e.g., tingling, burning, or tightness) are frequently experienced. Visual disturbances may include diplopia, blurring, or scotomas. Olfactory disturbances may also occur, and some studies have demonstrated that nearly a third of MS patients may show decreased sensitivity to scents.

Auditory symptoms such as hearing loss or tinnitus may occur, but their frequency of occurrence is relatively low. Likewise, gustatory symptoms are uncommon. Vestibular abnormalities such as dizziness and vertigo are common. Motor difficulties are also common, and they are present in as many as 60% of patients. Common motor symptoms include weakness, decreased dexterity, spasticity, incoordination, gait disturbances, and altered reflexes. Motor symptoms are more commonly demonstrated in lower rather than upper extremities. MS patients also tend to be easily susceptible to debilitating fatigue, and it is one of the most common and disabling symptoms of the disease. Furthermore, MS is manifested by dysarthric or slurred speech and difficulty swallowing. Patients may also report sexual dysfunction as well as bladder and bowel symptoms such as incontinence, urgency, retention, or constipation.

PSYCHOLOGICAL AND PSYCHIATRIC SYMPTOMS

In addition to these somatic symptoms, psychiatric symptoms frequently coincide with MS. Disorders of mood, characterized by depression, irritability, anxiety, mania, or lability, may occur in as many as 75% of patients at some time during the disease course. Early research especially noted euphoria or manic-like symptoms, but occurrence of depression is becoming increasingly recognized. Psychotic episodes may occur, but their incidence is relatively infrequent. Regardless, it is unclear whether these psychiatric symptoms are in reaction to illness or a manifestation of cerebral dysfunction. There is still disagreement in some quarters whether depression may reflect a maladaptive coping response to debilitating illness. Other research implies that brain lesions yield a release phenomenon in which depression, mania, or emotional lability emerges as a consequence.

NEUROPSYCHOLOGICAL IMPAIRMENT

Apart from mood disturbances, cognitive abnormalities are estimated to be present in 40% to 75% of patients with MS. Notably, cognitive difficulties do not correspond well with severity of motoric or sensory deficit in MS. As such, an individual with MS may display significant ataxia or paresthesia, but remain cognitively intact. A converse pattern may also exist in which no obvious motor and sensory symptoms are present, but the individual may demonstrate significant neurobehavioral abnormality. Thus, presence of cognitive impairment in MS is not necessarily obvious and may only be reliably assessed with standardized measures of cognitive function. Neuropsychological deficits may also wax and wane, as observed in some studies involving people with relapsing-remitting MS, suggesting that cognitive function improves during remitted states.

Perhaps the most common cognitive deficit associated with MS is memory dysfunction. Indeed, nearly all patients with MS who show even mild cognitive impairment have amnesiac symptoms. Some estimates hold that as many as 30% of patients will show significant memory impairment. The nature of these memory problems is somewhat controversial. Some studies have shown that MS patients have a diminished capacity to encode information. According to this view, an MS patient will learn less information than a neurologically normal individual, but the patient will recall and retain that information as effectively as the nonafflicted person. In contrast, other investigations suggest that the primary deficit of MS patients is one of retrieval. Thus, they may encode information better than they are able to recall it from memory. Presently, it is uncertain whether memory deficits associated with MS may be characterized in a single manner or if multiple types of memory deficits may occur among MS patients. Notably, some researchers have begun to evaluate medical and psychological interventions that may enhance memory function in people with MS. These endeavors have yielded inconsistent outcomes, with some showing no benefit and others finding mild benefit. Negative results notwithstanding, these data suggest that memory deficits may be remediable in MS.

Another common difficulty demonstrated by individuals with MS concerns executive function. In particular, MS patients are inclined to show impaired performance on measures of abstraction such as the Wisconsin Card Sorting Test. Individuals with MS are inclined to perseverate in incorrect problem solutions, and they seem to have difficulty comprehending abstract concepts. They are also apt to demonstrate poor performance on measures of verbal fluency, planning, self-regulation, and concept formation, and such impairment tends to correlate with volume of lesions and cortical atrophy. Such deficits are thought to reflect impaired decision-making capacity in MS. These difficulties are relatively common and are estimated to occur in as many as 20% of patients.

Attention deficits associated with MS have been demonstrated in several respects. For instance, MS seems to affect (diminish) speed of information processing, sustained attention, divided attention, selective attention, and span of attention. Such deficits are relatively common and occur in as many as 25% of patients with MS. These attention difficulties may diminish the ability of MS patients to encode and process information on a moment-to-moment basis. As such, during presentation of important information, selective details may be lost.

Individuals with MS are also apt to show poor performance on measures of visual perception and visual-spatial acuity. These problems are somewhat less common than the aforementioned deficits, and they occur in approximately 20% of patients. Additionally, language function may be diminished in MS. Ability to name objects and capacity to comprehend speech are impaired in approximately 10% of patients.

COGNITIVE DEFICITS AND ADAPTIVE FUNCTION

These cognitive deficits have a significant effect on MS patients' abilities to meet the demands of daily living (e.g., remembering appointments, telephone numbers, names, instructions). Indeed, a number of studies have shown that the presence of cognitive impairment, including memory dysfunction, is associated with deficits in vocational, domestic, and psychosocial function. Specifically, as memory impairment worsens, MS patients are less able to care for themselves and meet the demands of daily activities. Moreover, cognitive deficits emerge as a distinct and significant predictor of such deficits, even when sensory-motor symptoms (e.g., gait disturbance, numbness) are included in regression analyses.

IMPLICATIONS

Taken together, these findings indicate that many, if not most, individuals with MS demonstrate significant deficits on standardized measures of memory, executive function, attention, visual-spatial perception, receptive language, and expressive language. Inasmuch as these skills are thought necessary to appreciate, evaluate, and understand details of research protocols, the capacity to provide consent to research participation may be diminished in an appreciable proportion of MS patients. Although motor and sensory deficits may be obvious, neuropsychological difficulties do not necessarily correspond with the presence of cognitive deficit. Nor are deficits global enough to generate presumptions of incapacity. The only reliable means of identifying cognitive impairment is through the use of standardized measures of neuropsychological function. Therefore, whether an MS patient is able to provide informed consent will unlikely be apparent from the presence of motor or sensory symptoms.

Efforts to enhance cognitive function in people with MS have met with mixed success, although there are indications that some cognitive and medical interventions may alleviate forgetfulness. Therefore, neuropsychological deficit may be malleable in MS. If so, improving neuropsychological function may yield a concomitant improvement in capacity to provide informed consent to research participation.

TREATMENT

Although there is currently no cure for MS, research indicates that early treatment of MS symptoms reduces the frequency and severity of exacerbations, may limit the development of lesions, and reduces future disability. In this regard, high doses of corticosteroids given intravenously followed by lower doses of oral corticosteroids are commonly used to treat exacerbations. However, long-term use of corticosteroids can lead to serious side effects, including osteoporosis, stomach ulcers, and cataracts. While corticosteroids have been effective in addressing the immediate problems associated with MS exacerbations, they lack support for moderating disease progression and severity longitudinally.

In contrast, interferon drug therapy seems to possess some effectiveness in ameliorating disease progression with only moderate side effects. Interferons are proteins normally produced to modulate the immune system in response to viral infections and other foreign substances. Interferon gamma heightens the severity of inflammation and increases relapse rates in MS. Thus, three immunomodulator interferon treatments have been developed and approved by the U.S. Food and Drug Administration (FDA) to reduce interferon gamma secretion. Interferon beta-1a and interferon beta-1b, are self-injectable drugs used to modulate the immune system's effect on symptoms of MS. Ongoing research comparing interferon beta-1b and interferon beta-1a gives preliminary indications that the former may be more effective than the latter.

Glatiramer acetate is a polypeptide also approved by the FDA to treat relapsing-remitting type MS. Glatiramer acetate appears to reduce myelin damage by accepting T-cell attacks as a decoy. Studies examining effectiveness of glatiramer acetate indicate a well-maintained reduction in annual relapse rates, with milder side effects than interferon treatments. Mitoxantrone is an immunosuppressant drug previously approved to treat some types of cancer. Mitoxantrone is administered several times annually to slow neurological deterioration in rapidly worsening relapsing-remitting MS and progressive-relapsing or secondary progressive MS. A clinical trial of mitroxantrone showed that MS patients taking mitroxantrone had reduced disability and severity of exacerbations compared to those taking placebo; side effects were mild. This study indicates mitroxantrone's efficacy for worsening relapsing-remitting or secondary progressive MS.

Medication, cognitive rehabilitation, and physical, occupational, vocational, and speech therapies have been used to address the specific symptoms of MS. Medication appears to be most effective for symptoms of spasticity, tremor, and pain. Though disease course, severity, and symptoms vary, there are numerous pharmacological and therapeutic options available. Ongoing research continues to support advances and improvements in drug therapy. These advances notwithstanding, MS remains a chronic disease with no cure.

—Michael R. Basso and Taeh H. Ward

See also Myelin

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MYELIN

There are approximately 100 billion neurons in the brain. Neurons communicate with each other in a very complex fashion that is partially possible due to myelin. Before discussing myelin, there are a few specific facts regarding neurons that should be reviewed. Neurons, the building blocks of the nervous system, are surrounded by a membrane and have a nucleus that contains genes. Neurons also have projections, or extensions, called dendrites or axons. Both of these have different functions. The dendrites bring information to the cell and axons take information away from the cell body. Neurons form specialized connections called synapses and produces chemical substance referred to as neurotransmitters. During the first month of life, the number of connections or synapses dramatically increases from 50 trillion to 1 quadrillion. Neurons are able to communicate with each other through electrochemical processes. Information travels faster in axons that are insulated or wrapped with myelin. Myelination begins soon after birth and continues for many years. The presence of myelin makes communication between different parts of the brain faster and more reliable. What is myelin?

It may be helpful to think of myelin as a sheath that acts as an electrical insulator. During development, glial cells forming myelin sheaths are oligodendroglia in the central nervous system and Schwann cells in the peripheral nervous system, and they wrap their cell membranes around axons of some neurons, surrounding the axon with a tubular-like layered covering called myelin. The myelin sheath of a neuron consists of fat-containing cells, or lipoprotein layers, that wrap around the axon, giving neurons their characteristic white matter appearance. Myelin acts to insulate the axon from electrical activity. Since fat serves as a good insulator, the myelin sheaths act to speed the rate of transmission of an electrical impulse/signal along the axon. Because myelin serves as an electric insulator, axons wrapped in myelin are able to allow neuronal transmission of information at a higher rate of speed than those axons that are not myelinated.

Where does myelination begin? The process of myelination begins in the spinal cord and in some areas of the brain continues into adolescence and adulthood. This span of years suggests that the cortical regions myelinate at different times. In the frontal lobes and parietal lobes, myelination begins following

birth, while myelination in the frontal regions continues into adulthood. Glial cells allow the brain to continue growing after birth, as glia continue to divide and multiply while carrying out various important functions for normal brain function (including insulation of nerve cells with myelin). The significant increase in brain weight in the postnatal years is primarily a function of the brain's increased myelination. As the function associated with each cortical area in the brain emerges, myelination of the specific circuitry also emerges. Therefore, myelination can be thought of as a "marker" of the maturity of the brain circuitry.

The myelination processes can be compromised in a variety of ways. Congenital metabolic disorders affect the developing myelin sheath in the central nervous system. If the demyelination occurs later in life and not in the development stages, it can result from damage to the nerves due to some trauma, toxicity, or metabolic disorder. There are instances when remyelination occurs, and regeneration and repair result in recovery of the affected neural function. The dominant finding in primary demyelinating diseases is demyelination in the spinal cord, brain, and even the optic nerve. Why this demyelination occurs is unknown. Multiple sclerosis is perhaps the most well known of these types of primary demyelinating diseases.

—D. Tighe Cooke

See also Multiple Sclerosis

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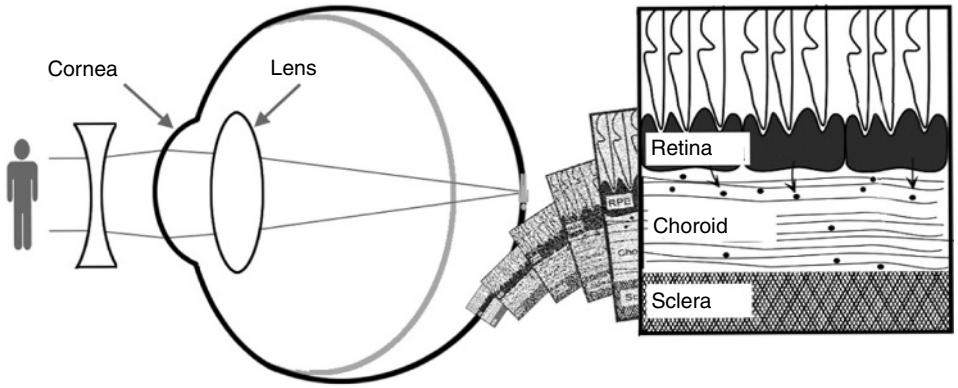
MYOPIA

Refractive errors occur when there is a mismatch between the length of the eye and its optical power. Myopia represents one type of refractive error, affecting up to 80% of children and young adults in some regions of Asia. The term *nearsighted*, which is synonymous with myopia, owes its derivation to the natural (uncorrected) state of focus of the eye being within infinity, typically within arms' length for myopic people. This state may arise because one or more of the optical components of the eye (cornea and crystalline lens) are more powerful than normal (refractive myopia) or because the eye is longer than normal (axial myopia). The axial form of myopia is by far the most common, and in humans, 1 mm extra eye growth corresponds to about 3 diopters of myopia (the normal adult eye is about 23–24 mm long). In all cases, the eye is relatively overpowered, resulting in blurred distance vision. To correct this imbalance, negative (diverging) lenses, either in the form of spectacles or contact lenses, are prescribed. Alternative surgical procedures for reducing the refracting power of the eye target the cornea (e.g., LASIK) and the lens (e.g., clear lens extraction) have practical advantages but are not without risk, and neither of these approaches ameliorates the problem for an axial myope of having an abnormally large eye.

Myopia typically occurs as a developmental (acquired) phenomenon, first appearing during childhood or early adolescence (so-called juvenile-onset myopia), although it may occur later, in early adulthood (so called late-onset myopia), or may be present at birth (congenital myopia). While refractive errors, including myopia, are very common in newborn infants, these errors are typically corrected in the course of normal ocular growth. The term *congenital myopia* is reserved for those cases of high myopia that do not disappear. On the other hand, developmental myopia arises when eyes continue to elongate after reaching the state of perfect focus (emmetropia).

It is likely that both environmental and genetic factors play roles in the development of myopia. Evidence of the former is the rising prevalence in myopia worldwide, apparently linked to the increasing educational and near-work demands of modern daily life. While the etiology of myopia in humans is still a matter for conjecture, animal-based studies point to poor near focusing during reading as a possible contributing factor. Other factors, including the quality of the eye's optical components and nutrition, may also come into play. On the other hand, genetic influences provide a logical explanation for why Chinese and Japanese ethnicities are among the most susceptible to myopia.



The eye is like a camera, with the cornea and lens providing the optical power of the eye and the retina acting as the sensor or seeing layer of the eye. The retina is supported nutritionally by the adjacent choroid and mechanically by the sclera, which also determines the overall size of the eye.

Familial inheritance patterns also argue for genetic influences. Molecular genetic studies have identified three loci for autosomal-dominant high myopia as well as the genes responsible for some of the "syndromic" high myopias (i.e., occurring as a feature of a systemic disease). However, it is likely that more complex, multifactorial inheritance patterns underlie low to moderate myopia, as well as some high myopia.

Current treatment options for myopia are limited in both scope and efficacy, with progress in developing treatments for myopia having lagged far behind the rising prevalence in myopia and ocular heath care costs associated with its management. Apart from the costs associated with its correction, myopia attracts additional costs associated with the management of complications such as retinal detachment and glaucoma. The former reflects the excessive stretching and thinning of the retina, the "seeing" layer of the eye, that accompanies the excessive eye enlargement. These sight-threatening complications place myopia third among the leading causes of blindness today. In terms of antimyopia treatments, only two drugs currently are used clinically. One such drug, atropine, has a long history of use, and while it has been shown to be effective in slowing myopia progression in both humans and animal studies, visually debilitating ocular side effects, including glare and impairment of near focusing ability, as well as allergies, have contained its use. Another closely related drug, pirenzepine, is currently under clinical trial in the United States; early reports suggest that it is less effective but has fewer ocular side effects than atropine. Bifocal and progressive addition spectacles represent optical treatment strategies that seem to benefit most myopes who tend to overconverge (turn their eyes in too far) during near work. More recently, bifocal contact lenses have also undergone limited testing, with promising results. Apart from these antimyopia treatments, there are surgical procedures for reinforcing the weakened sclera for high myopia, aimed at limiting further ocular enlargement and thus the blinding retinal complications.

Today myopia is the subject of extensive research worldwide. The likely outcomes of this research are better understanding of the mechanisms underlying the development of myopia, better predictors of who is likely to develop myopia, and more effective treatments.

—Christine F. Wildsoet

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N

Neighborhoods

Love thy neighbor as thyself, but choose your neighborhood.

—Louise Beal

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS (NAEP)

The National Assessment of Educational Progress (NAEP), also known as the Nation's Report Card, serves to measure student academic performance using a representative sampling process. NAEP has measured educational achievement in various subjects periodically since 1969. Through the years, the subject areas of mathematics, reading, science, history, and the arts have been assessed at grades 4, 8, and 12. For about the first 20 years, the assessments were given to a nationally representative sample of students in each of those grades. In the early 1990s, large enough samples were selected to generate state-level results. Now, each state and jurisdiction must participate in the NAEP reading and mathematics tests at grades 4 and 8 every odd-numbered year as instituted by the federal No Child Left Behind Act of 2001.

Currently, there are two bodies that oversee all aspects of NAEP. The National Assessment Governing Board (NAGB) determines the policies to which the assessment must adhere. That is, NAGB oversees the development of the assessment frameworks from which the actual assessments are developed, determines the subject assessment schedule, and determines various other policies as needed. This board is nonpartisan and has members from throughout the United States. The National Center for Educational Statistics (NCES) manages the actual processes used to generate, score, and report results from the assessments.

The sampling process involves a two-stage stratified process in which demographic variables are taken into account when randomly selecting districts and then schools within them. This process provides the best representation of the nation and states, with a relatively small sample of students. There are about 2,500 to 3,000 students selected per grade level per subject for any one state, including both public and private schools. The stratified sampling ensures that this group of students adequately represents the grade-level student population as a whole within the state.

No one participant completes the entire assessment. Students are randomly assigned to one of the subjects to be assessed (e.g., reading or mathematics). The assessment consists of multiple blocks of items. Students take two of the available blocks of questions in the subject to which they are assigned. Student responses are then scored individually and the results aggregated to form state and national reports. No student-level or school-level data are analyzed or reported. Scorers are rigorously

trained on an item before rating the response. This calibration process occurs before scoring a new item and after extended breaks.

Before the 2003 NAEP assessment period, reporting results took more than 1 year. However, it is now required that results be available about 6 months from the end of the testing window. The testing window for most NAEP assessments, including those required by law, is the last week in January through the first week in March.

NAEP results are reported at the national and state levels. For both levels, subgroup reports are provided on the basis of gender, race/ethnicity, disability status, limited English status, Title I status, school lunch status, and school size. The results are reported as both average scale scores and proficiency levels. NAEP uses the proficiency levels of basic, proficient, and advanced to report what students should know and be able to do.

—Canda D. Mueller Engheta

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NATIONAL CENTER FOR EDUCATION STATISTICS (NCES)

The arm of the U.S. Department of Education that gathers, analyzes, and reports educational data for states, the nation, and other nations is known as the National Center for Education Statistics (NCES). The center accumulates information using a variety of surveys and assessments. NCES houses several databases in an effort to disseminate information as widely as possible. The center also periodically holds data trainings and seminars so that prospective researchers understand what can and cannot be studied using the data at hand. The primary programs managed by NCES are focused in four broad areas: cross-sectional databases, longitudinal data surveys, assessments, and lifelong learning.

NCES maintains databases and analyzes information from multiple cross-sectional sources at the elementary, secondary, and postsecondary levels. These databases include the Common Core of Data (CCD), the Schools and Staffing Survey (SASS), and the Private Schools Survey (PSS) at the elementary and secondary levels. Postsecondary databases include the Integrated Postsecondary Education Data System (IPEDS), the National Postsecondary Student Aid Study (NPSAS), the National Study of Postsecondary Faculty (NSOPF), and the Survey of Earned Doctorates Awarded in the United States (SED). Another database serves as a collection center for information that crosses all three of the above areas. The National Household Education Survey (NHES) accumulates data on childhood and adult education, educational activities in the home, and adult education. Some databases are updated annually, like the CCD. Others are updated every 2 years, like the PSS.

Longitudinal surveys directed by NCES have included the Early Childhood Longitudinal Studies (ECLS) with birth and kindergarten cohorts, the National Education Longitudinal Study of 1988 (NELS), and the Baccalaureate and Beyond Longitudinal Study (BLS). Reports and data for these and other longitudinal studies can be found on the NCES Web site. The longitudinal studies provide information on many educational issues such as student achievement changes, postsecondary education access, youth employment, and school quality.

National and international assessments are also organized by NCES. The primary national assessment is the National Assessment of Educational Progress (NAEP). There are several international assessments that NCES coordinates. These include the Progress in International Reading Literacy Study (PIRLS) conducted every 5 years, the Trends in Mathematics and Science Study (TIMSS) conducted every 4 years, and the Program for International Student Assessment (PISA) conducted every 3 years.

Information on lifelong learning is provided from library surveys and other adult surveys. Data allowing individuals to locate and compare libraries can be found

in the Library Statistics Program database. NCES also provides information on lifelong learning in the form of the National Assessments on Adult Literacy (NAAL) and the Data on Vocational Education (DOVE).

The educational statistics managed by NCES are used for a multitude of purposes. Congress uses the information when planning federal programs, studying educational issues, and apportioning federal educational funds. Federal agencies use the information to learn about the trained workforce supply exiting secondary and postsecondary schools. The news media often make use of the statistics in news accounts. Businesses analyze trends to forecast demand for employees and for their products. Finally, the general public uses the data in multiple ways such as quality comparisons of school districts and universities.

—Canda D. Mueller Engheta

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NATIONAL HOSPICE STUDY

The National Hospice Study was initiated in 1980 through a grant sponsored by the Robert Wood Johnson and John A. Hartford Foundations and the Health Care Financing Agency (HCFA). The aim of the 3-year study, begun in the summer of 1981, was to conduct a national evaluation of hospice that provides palliative and supportive care for terminal patients. The purpose of the evaluation was to determine hospice quality of care and cost for federal health care financing and legislation. The study examined more than 1,700 patients and their families in home care hospice, hospital-based hospice, and conventional (hospital) care. Using a quasi-experimental design, the study assessed the impact of hospice care on the quality of life of hospice patients and focused on health care costs experienced by patients and their families. Major research questions included the following: What is the differential impact of hospice on quality of life? What are the differential costs of caring for comparable terminally ill patients? What are the differences between services that hospice and nonhospice patients receive? What is the likely impact of Medicare reimbursement on hospice organizations? What are the national cost implications of hospice?

Findings from the National Hospice Study provided answers to these key questions. Small but statistically significant differences were observed between hospice and nonhospice patients in terms of pain, symptoms, and satisfaction with care. However, in general, there were no consistently observable differences between hospice and nonhospice patients in quality of life. Findings emphasizing cost differentials were mixed. Home care hospice reduced costs because family members provided extensive care. A more recent study conducted in 1995 arrived at similar conclusions, although the latest study focused only on cancer patients. In the National Hospice Study, hospital-based hospices also utilize home care services, such that per diem hospitalization costs tend to be low relative to conventional inpatient care. One interpretation of the data suggests that cost savings associated with home care hospice may be due to shifting the burden of care from a formal health care sector to informal family caregivers. Comparing both home- and hospital-based hospice patients and conventional care patients during the last years of life, the study found that increases in length of stay yielded higher costs associated with hospice than with conventional hospital care, largely because economies occur in the last weeks of life.

Kinds of services also differed. Study results indicated that hospice patients received substantially more care at home and had shorter hospital stays during their last month of life than conventional care patients. Hospice patients (of both types) received less chemotherapy, surgery, radiation therapy, transfusions, diagnostic testing, and intravenous therapy than conventional care patients, but they were more likely to receive social services, such as counseling.

Based in part on the findings of the study, the Tax Equity and Fiscal Responsibility Act of 1982 was passed. Congress authorized Medicare to reimburse hospices for terminally ill patients (with some restrictions). The Medicare hospice benefit is a cost-containment mechanism to limit high costs and improve quality of life. Nowadays, Medicare is the primary payer of hospice services, covering 77% of all costs (Medicaid, private insurance, and other sources cover the remainder of expenditures). In 2002, there

were 3,200 operational hospice programs admitting 885,000 patients throughout the year.

Because home care hospice reduces costs but hospital-based hospice does not, policy implications depend on the kinds of questions that motivate decision making. Hospice has some positive, and apparently no negative, effects, which suggests that it is a viable alternative for terminal care of patients.

—Matthew E. Archibald

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NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT (NICHD)

The National Institute of Child Health and Human Development (NICHD), one of the 27 institutes and centers of the federal government's National Institutes of Health (NIH) in Bethesda, Maryland, is the world's largest source of support for research on human development. With a budget in 2005 of $1.25 billion, it supports more than 2,000 grants and contracts for biomedical and behavioral research and training in maternal and child health, population and reproduction, and medical rehabilitation.

The NICHD was established by Act of Congress in 1962 at the request of the Kennedy administration to provide a focal point for research on mental retardation and other developmental disabilities and on improving pregnancy outcome. It differed from other NIH institutes that focused on a disease (e.g., National Cancer Institute) or an organ system (National Heart Institute) by focusing on the broad aspects of human development, in the belief that many adult disorders have their origins prenatally or in childhood and involve abnormalities or deviations in the normal developmental process that, if avoided or corrected, would prevent disease and disability. The institute began operations in 1963 and since then has invested more than $13 billion in supporting scientists in testing their hypotheses and developing new treatments and preventive measures to improve health. As one measure of its impact, the U.S. infant mortality rate has declined by 70% since NICHD was established, with much of the decline directly traceable to advances from NICHD research.

Like other institutes, NICHD provides 85% of its funds directly to the scientific community through competitively awarded grants and contracts. Scientists who have an idea to test and require funds to do so apply through their institution for a "grant in aid" from the federal government (NICHD) to assist them in their research. Those with the best proposals, based on competitive peer review, receive funds for their institution to help them carry out their project. They provide annual progress reports on their research and may apply for renewal funds to continue their work.

Another 10% of the institute's funds go to support its own scientists in the laboratories and clinics in its intramural program. These scientists are government employees and conduct their research at the NIH campus in Bethesda or in satellite facilities elsewhere. Both intramural and extramural scientists have made major contributions to knowledge that have improved health.

In carrying out its mission, the institute supports not only grants for individual research projects but also grants to support research training, research centers, networks for multisite clinical trials, and contracts for product development. The range of topics addressed by the NICHD is enormous and the broadest of any institute. It encompasses trying to understand the developmental process by which a single fertilized egg develops into a physically mature human being, with all the complex behaviors that result from environmental and genetic influences on that process. Thus, the institute supports research in fertility and infertility (including contraceptive development and use), embryology and teratology, processes of pregnancy and delivery, care of the normal and premature newborn, nutrition and growth and their disorders, developmental disabilities, behavioral and social and cognitive development, learning and its disorders, adolescence, health behaviors, injury, and rehabilitation. All these program areas help the institute toward its goals of having all children born healthy and wanted, women suffering no adverse consequences from the reproductive process, all children reaching adulthood

free of disease and disability and able to achieve their full potential, and optimal restoration of function through rehabilitation.

Advances from NICHD research include the Hib conjugate vaccine to prevent meningitis, home pregnancy test kits, improved reading instruction based on phonemic awareness, reduction of mother-to-infant AIDS transmission from 25% to 1%, and reduction of SIDS by 50% with the Back-to-Sleep campaign.

With continued investment of the tax dollars of the American people in research on human development, even greater discoveries lie ahead.

—Duane Alexander

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NATIONAL VITAL STATISTICS REPORTS

The *National Vital Statistics Reports* are a series of reports published by the U.S. Center for Disease Control and Prevention's National Center for Health Statistics. The mission of the National Center for Health Statistics (NCHS), the principal health statistics agency of the United States, is to provide statistical information that will guide actions and policies to improve the health of the American people. The *National Vital Statistics Reports* series is an integral component in fulfilling this mission.

The primary purpose of the *National Vital Statistics Reports* is to present statistical data from the National Vital Statistics System. The National Vital Statistics System is the oldest and most successful example of intergovernmental data sharing in the field of public health. The system involves the cooperative development of standards and procedures and provides the mechanism by which NCHS collects and disseminates consistent and comparable official vital statistics for the United States. These data are provided to NCHS through the Vital Statistics Cooperative Program by the various jurisdictions legally responsible for the registration of vital events and the issuance of certified copies for births, deaths, marriages, divorces, and fetal deaths. In the United States, legal authority for the registration of these events resides individually with the 50 states, two cities (Washington, DC, and New York City), and the five territories (Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands). The *National Vital Statistics Reports* also provide a means by which NCHS can offer guidance to state and local health agencies in the tabulation, analysis, and presentation of vital statistics.

The *National Vital Statistics Reports* series was introduced in 1998 as the successor to the venerable, but now discontinued, *Monthly Vital Statistics Report* series (first published in 1952). The *National Vital Statistics Reports* series, which begins with volume 47, is considered to be an extension of the *Monthly Vital Statistics Report*, which ended with volume 46. The two series are very similar in content, although somewhat different in format and numbering.

The content of the *National Vital Statistics Reports* consists of monthly reports presenting provisional counts of births, deaths, marriages, and divorces; annual reports presenting preliminary birth and death statistics; and annual reports presenting final statistics on births, deaths, infant deaths, leading causes of death, injury-related deaths, and life expectancy. In addition, reports are published on special topics of interest in vital statistics. Examples of such reports include "Births to 10–14 Year-Old Mothers, 1990–2002: Trends and Health Outcomes" (volume 53, number 7); "Reproduction Rates for 1990–2002 and Intrinsic Rates for 2000–2001: United States" (volume 52, number 17); "Comparability of Cause of Death Between ICD-9 and ICD-10: Preliminary Estimates" (volume 49, number 2); and "Age Standardization of Death Rates: Implementation of the Year 2000 Standard (volume 47, number 3)." Several recent reports have focused on state-level data, including illustrative maps. An example is "Trends in Characteristics of Births by State: United States, 1990, 1995, and 2000–2002."

—Robert N. Anderson

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National Vital Statistics System, http://www.cdc.gov/nchs/nvss.htm

NATIVE AMERICANS

Native Americans are the indigenous peoples of North America; the focus here specifically is on those who reside within the national borders of the United States. For some tribal groups presently in the United States, these borders are somewhat arbitrary because they historically occupied regions that span the borders with Canada and Mexico. Indeed, indigenous peoples inhabited and migrated throughout North America before European contact and conquest, before the evolution of present-day states, provinces, and nations. In Canada, indigenous groups are known as First Nations people, and in Mexico, they are referred to as *los indigenás*. *Native Americans* is an omnibus term that belies the heterogeneity within this group; it includes American Indians and Alaska Natives, given that both these indigenous peoples reside within the United States and are citizens of this country. Proper use of these labels has been evolving and continues to do so. Indeed, some groups and individuals who would be included in these designations prefer certain labels over others.

Regardless of such overinclusive terminology, there are stark differences between American Indians and Alaska Natives, as well as considerable within-group differences in each. According to the U.S. Census of 2000, there are 561 federally recognized tribal groups in the United States (as well as others that have been denied such designation, or are recognized solely by states or localities); consequently, there is tremendous heterogeneity. Within the federally designated categorization, about 60% are American Indian tribes and 40% are Alaska Native Village groups. Although there may be commonalities in some values and in orientation to the land, there can be great differences among groups. The Seminoles in Florida, for example, are remarkably different than the Senecas of New York State in terms of lifestyle, cultural morays, economics, and art. Each of these groups typically has its own unique culture, history, and historical and contemporary lands. There are considerable differences within tribal groups as well; some American Indians consider themselves more "traditional" in following a Native way of life, and others less so, or not at all. Degree of identification and acculturation with one's tribal group, and similarly degree of identification and acculturation with the dominant culture or other minority cultures, determines in part one's beliefs and activities.

Societal views often cast Native Americans back in history, assuming to arrest their societal development at the point of European contact. Moreover, views of Native Americans often focus on historical images of Plains Indians, with feather headdresses, horses, and teepees, which allow glossing over the rich diversity across American Indian and Alaska Native cultures. Hopefully, this description will serve to dispel some stereotypes and to provide a contemporary view of Native American culture and development.

DEMOGRAPHIC INFORMATION

Native Americans reside in every state in the United States; U.S. Census data from 2000 indicate the greatest numbers are in California, Oklahoma, Arizona, and Texas. Native Hawaiians typically are included in Pacific Islander ethnic designations, although they are indigenous people in the United States and so could rightfully be considered Native Americans. The 2000 Census indicated that only about 13% of Native Americans resided on reservations, contrary to stereotypes. Moreover, slightly less than half of Native Americans in 2000 lived in the region defined by the U.S. Census Bureau as "west." In the 2000 U.S. Census, there were about 2.5 million people who identified as American Indian or Alaska Native. An additional 1.6 million indicated they belong to more than one racial or ethnic category including Native American; these 4.1 million people constituted 1.5% of the U.S. population in 2000.

HISTORICAL CONSIDERATIONS

At the time of European contact, there were flourishing indigenous cultures throughout North America. Advanced building and agriculture were evident in many cultural groups, as were governmental and other social structures. Nevertheless, the superior technology and numbers of Europeans overwhelmed these cultures, forcing them into assimilation or subjugation and, frequently, removal from their ancestral lands. The history of contact with Europeans is, unfortunately, rife with domination and colonization. Exposure to new diseases (e.g., smallpox) from Europeans, for which there was little or no immunity in indigenous peoples, was a factor in the decimation of significant proportions of Native groups. In fact, history suggests that many Native people were intentionally exposed to lethal diseases. Moreover, Indians were treated as intruders on their own lands.

Governmental policies in the 1800s and early in the 1900s led to direct and forcible removals of various indigenous groups, leading to various "trails of tears" or to attempts to force them into the lifeways of the dominant culture (e.g., through forced assignment to residential boarding schools). Moreover, at different times, war was waged between various tribal groups and the U.S. government. In summary, the history before European contact reveals thriving cultures and a people who were evolving naturally in social and technological realms. The historical record after European contact is much bleaker; annihilation through disease and warfare decimated the Native American population throughout much of North America. Recent history is more promising; Native peoples have empowered themselves to revitalize their languages and have persevered to keep traditions and other aspects of their culture alive. Although much work remains, through their resilience, the indigenous people of North America have helped promote a celebration of their culture, history, and lifeways, such as through the 2004 opening of the National Museum of the American Indian on the national mall in Washington, DC.

CURRENT SOCIAL AND HEALTH ISSUES

Beginning to understand any people can only be accomplished by appreciating not only their history but also the current social and other environmental issues that affect them, both individually and as a group. There is much to be honored in contemporary Native American life. Tribal and village groups are having successes in economic development, creating businesses such as those in the realm of eco-tourism, arts and entertainment, the gaming industry, and outdoor recreation. There are social advancements, too, such as in the focus on health promotion and prevention of health problems.

At the same time, much work remains in a variety of areas. As an ethnic minority group in the United States, Native Americans continue to face prejudice and discrimination. Although Native Americans are idealized by some with romantic notions, they are vilified by others, related to their ethnic minority status. Consistent with economic and social obstacles, the formal educational attainment of Native Americans as a group is the second lowest of all the major ethnic and racial groups in the United States. U.S. Census data from 2000 indicate that about 71% of Native Americans have graduated from high school, compared with 80% of the U.S. population as a whole, whereas 12% of American Indians and Alaska Natives have at least a bachelor's degree, compared with 24% of the general population.

Other social issues include sovereignty concerns with states and the federal government. As independent nations, some with their own reservation or tribal lands, Native American groups expect, and have often been promised through treaties, autonomous functioning. Yet, the present reality is that their independent functioning sometimes is compromised. In terms of economic development, casino gaming on Native American reservation lands has become very visible in the larger society, which may engender certain assumptions of wealth and availability of entitlements to all Native Americans as individuals, which belies the poverty experienced by some. Unemployment and lack of job opportunities, particularly in rural areas and specifically including many reservations, is an ongoing problem. In the realm of health concerns, diabetes and obesity are rampant in many Native American communities. Alcohol and other drug abuse also is a problem, as is smoking and other tobacco use.

Native Americans' life expectancy is significantly less than that of other ethnic groups in the United States. Work by Rhoades, as well as information from the Indian Health Service, suggests the causes of this health disparity have been purported to be disproportionate amounts of disease (e.g., diabetes), poverty, the effects of increased rates of alcohol and other drug abuse, greater use of tobacco, and greater risk for vehicular accidents and interpersonal violence. Native Americans' male death rates before the age of 75 are higher than female deaths, sometimes twice as high. About 23% of male deaths occur before age 34 years, whereas only 16% of female deaths occur by the same age. Fifty percent of Native American/Alaskan Native male deaths occur by age 54 years, whereas 50% of Native American/Alaskan Native female deaths occur by age 64 years. The leading cause of death for Native American/Alaskan Native men and women is heart disease. Following heart disease, accidents, cancer, chronic liver disease, suicide, diabetes mellitus, cerebrovascular disease, and pneumonia/influenza are the next leading causes of death for males. For women, the leading causes of death after heart disease are cancer, accidents, diabetes, cerebrovascular disease, chronic liver disease, pneumonia/influenza, and suicide. Native Americans are victims of homicide at a significantly higher rate than individuals of all ethnic and racial groups in the United States; for example, Native

American males between the ages 15 and 34 have a homicide death rate of 40 per 100,000, compared with males of all races in the same age group, with a homicide death rate of 34 per 100,000. Moreover, Native males are more likely to be victims of homicide than women; for example, females 15 to 34 years of age have homicide rates of 7.6 per 100,000. Unfortunately, Native children younger than 14 are twice as likely to be the victims of homicide compared with children of all races of the same age in the United States.

These social factors continue to evolve, with many positive steps already haven been taken. Some of the issues, such as health problems, are similar in some respects to those of other cultural groups in the United States. Other considerations, such as sovereignty, are unique to Native peoples in the United States.

PSYCHOLOGICAL PROCESSES AND ISSUES

Psychological factors are of course influenced by both history and current social and other environmental factors. In many respects, Native Americans have the same psychological processes and encounter the same psychological issues that affect all peoples, particularly those in North America. Yet there are unique considerations, too, which are the focus of this section.

Values

Some value orientations of Native Americans and other cultural groups in the United States may differ from one another. Although there undoubtedly are many more similarities than differences, the literature suggests several areas in which Native Americans may have unique, culturally based values. One developmentally relevant example is that some Native American children may be socialized to be autonomous in self-care skills and independent activities at an earlier age than some other U.S. cultural groups. Similarly, in this often collectivist group, the concept of family is broadly defined to include an orientation to extended family members and to include as family closely aligned individuals who share no blood or marital relationship bonds. Child-rearing responsibilities often are partially assumed by such extended family members.

Suicidality

Suicide is a major public health problem among most Native American age groups. Depression and associated hopelessness, related alcohol and other drug abuse, and lack of control and few social options undoubtedly are some of the determinants of this problem. Suicidality among Native American youth has been described as epidemic because those 15 to 24 years of age are two to four times as likely to attempt and complete suicide than other adolescents. Berlin's work suggests there are several patterns of suicide among Native American adolescents; one such type of completed suicide is that committed by males, usually while intoxicated. Data from the Indian Health Service suggest that Native American males older than 45, in contrast, have lower suicide death rates (13.9–25.1/100,000 deaths) than males of all ethnic and racial groups in the United States (22.9–63.1/100,000). Native American males between the ages of 5 and 44, however, have significantly higher suicide rates (4.0–66.7/100,000 deaths) than males of all races (1.3–25.7/100,000 deaths). Males 25 to 34 years of age in the Native American population have the highest suicides rates at 66.7 per 100,000, followed relatively closely by males 15 to 24 years of age at 53.5 per 100,000. Similarly, Native American females have higher suicide rates (1.4–13.4/100,000 deaths) than females of all races in the United States (0.4–6.7/100,000). Women ages 15 to 24 are reported to have the highest suicide rates compared with other age groups in this population at 13.4 per 100,000.

Alcohol and Other Drug Abuse

Alcoholism is a severe problem, historically and currently, for the indigenous peoples of North America. Alcoholism likely contributes to the short life span of many Native Americans.

It has been argued that Native Americans may have a higher susceptibility to alcoholism because of a lack of the dehydrogenase enzyme. It has been suggested that Native Americans have a higher alcohol metabolism rate than other groups.

Alcoholism-related deaths among Native Americans, reported by the Indian Health Service, are highest for individuals between the ages of 45 and 64, with 131 per 100,000, compared with the overall rates for all ethnic and racial groups in the United States of 17.5 to 22.3 per 100,000. For males, death rates are highest between the ages of 55 and 64 at 182.4 per 100,000 deaths, compared with 36.4 per 100,000 among all ethnic and racial groups in the United States; for females, death rates are highest between the ages of 45 and 54 at 97.8 per 100,000 deaths, compared with 7.5 per 100,000 deaths for all ethnic and racial groups.

Alcohol and other drug abuse, including inhalant and marijuana, affect Native American youth at a disproportionate rate compared with other ethnic groups. Drug-related deaths from 1994 to 1996 are estimated at 4.0 per 100,000 deaths for Native American males and 4.2 per 100,000 for females ages 15 to 24 years, compared with 0.1 per 100,000 for males and females of all ethnic and racial groups in the United States.

Native Americans are believed to be one of the ethnic groups most at risk for *fetal alcohol effect* (FAE) and *fetal alcohol syndrome* (FAS). FAE is a less severe form of FAS. Consumption of alcohol by the mother during pregnancy can lead to FAE or FAS; the deleterious effects are related to the amount of consumption, when alcohol consumption occurs (e.g., which trimesters), and the period of duration. Both FAE and FAS are characterized by neurological defects, central nervous system aberrations (e.g., mental retardation), growth deficits, and physical and facial malformations. Both FAE and FAS have significant developmental effects because they typically result in slowed learning, organization difficulties, and ultimate difficulty in maintaining employment and becoming self-sufficient.

Psychological Disorders

Adults

When compared with the white majority, Native Americans appear at an increased risk for mental health problems. In particular, there is susceptibility to anxiety disorders, psychosomatic disorders, and depression, with concomitant substance use disorders. Depression is the most widespread mental disorder for both Native American children and adults, and the historical abuse and current socioeconomic barriers of this population are likely contributors to this increased depression risk. Psychological assessment of Native Americans must be sensitive to the fact that different norms may be necessary for this unique cultural group, as suggested in the work of Richard Dana. Similarly, there should be sensitivity in employing psychological interventions to ensure they are culturally appropriate.

Women's Issues

There is limited evidence to suggest differential rates of certain mental health problems for Native American women as compared with whites. In a study of mental disorders in Native American women presenting for primary care by Duran and colleagues, higher lifetime prevalence rates for alcohol use disorders, anxiety disorders, and anxiety and depression comorbidity were found for Native American women as compared with general U.S. population studies. High levels of debt, low educational level, and low self-rated health were related to mental disorder prevalence. The relation between women's mental health problems and abuse also merits discussion because Native American women are at a substantially higher risk for lifetime abuse than are other women in the United States. Native American women experience more serious violent crime, rape or sexual assault, other assault, and overall crimes of violence than do women in other groups. Rennison reported in 2001 that intimate partner violence, for example, was found to be significantly greater for Native American women (23.2/1,000) than for their African American (11.2/1,000), Caucasian (8.1/1,000), or Asian (1.9/1,000) counterparts. The victimization experienced by Native American women has been associated with mental health problems such as depression and substance abuse.

Children and Adolescents

Native American youth have historically been regarded as being more at risk for developing mental disorders than are children of other racial and ethnic groups. Studies have highlighted the potential impact of the disproportionate psychosocial stressors experienced by Native Americans as compared with whites. Recent examinations have brought to light the complexity of mental health risk factors for children of all racial and ethnic groups. Reviews on child development among Native Americans have consistently discussed the detrimental effects of poverty, depression, child maltreatment, substance abuse, and educational barriers to healthy development.

Some studies have shown a relationship in the opposite direction of the historical viewpoint, conceivably reflecting protective factors against psychological distress inherent in Native American cultures. These results are in line with the conclusions of Samaan, whose extensive review found socioeconomic deficits to affect the mental health of children, regardless of racial or ethnic group. Specifically, mental health risks were significantly greater for poorer children as compared with wealthier children for all races and ethnicities. Interestingly, Samaan also concluded that racial and ethnic minorities, including Native Americans, African Americans, and Hispanics, had a lower risk for mental health problems as compared with white children after

controlling for poverty. Cultural factors that may protect against psychological distress, including spirituality, attitudes toward mental illness, social support, and the extended family orientation, were indicated as possible explanations for this decreased risk.

Factors influencing the mental health of Native American children are numerous and complex. The multifaceted development and treatment of mental health problems for Native Americans, particularly including youth, are only beginning to be understood. Recent efforts in providing services for Native American children are focusing on prevention and the development of innovative mental health treatments that incorporate the unique traditions, languages, and spiritual and cultural practices of each tribal or village group.

Child Maltreatment

As with the general population, Native Americans are faced with high rates of child maltreatment. Most maltreated children experience both abuse and neglect. Sexual abuse, in particular, has been significantly related to negative mental health outcomes. Specifically, in one study by Robin and colleagues with Southwestern Indians, females who were sexually abused as children were four times as likely to meet criteria for multiple mental health disorders as compared with females not in foster care and females without an abuse history. In their investigation of maltreated Native American children ranging in age from birth to 21, Lujan and collaborators found alcohol abuse present in most maltreatment cases. Additionally, like trends evident in the general population, abuse and neglect of children in Native American samples are highly related to levels of family chaos. Further, abused and neglected Native American children are more likely to run away, use drugs, and exhibit psychological problems than children without such history of maltreatment. For a detailed review of child maltreatment, its effects, and culturally sensitive interventions for Native American children, the reader is encouraged to see the work of Willis, Dobrec, and Sipes (1992).

LIFE SPAN DEVELOPMENT

Worldview and Spirituality

As described by Markstrom, developmental processes and perspectives about them among indigenous peoples in North America are inextricably intertwined with their worldview. Spirituality is described as an all-encompassing basis for existence and processes throughout the life span. For most indigenous groups, life is viewed as circular. As an example, for many Lakota, five stages of life are identified: newborn, childhood, adolescence, maturity, and old age; these stages are superimposed on the four directions, beginning with the south, then west, north, and east, ending with the fifth stage culminating in and returning to the south. Along with this relational worldview, throughout development there is an emphasis on establishing and maintaining harmony in oneself, and in one's relationships with family and society. For traditional Navajo, "Hózhó" or "Walking in Beauty," is consistent with this idea of harmony among the physical, emotional, psychological, and spiritual domains of existence. In the 1990 book *Wisdomkeepers* about Native American elders, this circularity, and universal harmony, is described thusly by Arden and Wall: "There's the cycle or the circle of the seasons, the circle of the ceremonies, the circle of Elders, the cycle of the generations, and the circle of all life, of which mankind is only one aspect—all things one" (p. 123).

Beliefs about human personality among many indigenous groups also are tied with conceptions of development and associated practices. The work of Markstrom suggests four beliefs about personality that appear to be relatively universal among Native Americans. The importance of (a) wholeness and harmony and (b) balance and moderation, in conjunction with (c) the coexistence of interdependence and cooperation with personal autonomy and individualism are construed along with (d) an understanding of the complement of opposites (e.g., male and female associations with aspects of nature, such as mother earth and father sky).

Phase of Life Transitions

As with Western developmental theories, the concept of "critical periods" is implicit in Native models, as noted in the work of Markstrom. Such phases are especially important during rapid periods of change, such as during puberty, when adolescent identity is being formed. Other critical periods include the time when one forms a lasting mating relationship, childhood rituals (e.g., naming ceremony, first haircutting), the perinatal period, and old age, as noted in a later section. Coming-of-age transitions and their associated rituals are provided as examples of critical periods in the life span, when ceremonies typically begin to be differentiated on the basis of sex. At this time, boys and girls uniquely are prepared, through

ritual and other teaching, to assume gender-specific adult responsibilities and roles. Ceremonies at this time of life typically are conducted to promote connections with one's Native community and ancestors as well as to be in touch with the physical environment; thus, a communal orientation may be achieved to promote social responsibility. Personal strengths also may be inculcated by such practices.

Menarche

Puberty is a highly transitional time associated with biological, psychological, and social sensitivity. In that puberty is associated with menstruation in girls, they have a special status at this time. Often girls are thought to be at a critical juncture; the girl's behavior or experiences at this point may affect her entire life. Historically, as noted by Hodge, great power over those within close proximity was ascribed to menstruating girls, so they often were cloistered away from others. In focusing on girls at menarche, Markstrom forwarded nine beliefs about pubescent girls that seem to have general applicability to many North American Indian groups. One of these beliefs is that the coming-of-age event is a transition from childhood to adulthood as well as a transition into the world of the spiritual. For example, at the fourth and final day of the Diné (Navajo) female pubertal coming-of-age ceremony (Kinaaldá), the initiate is perceived to transcend to an empowered state such that she can provide blessings to others.

Vision Quests

Historically, the transition to adulthood for boys of some tribes has been marked by a rite of passage, the vision quest, a ritual practiced for the purpose of gaining spiritual insights; it has been identified as particularly important to the tribes of the Plains and Plateau Indians. The vision quest, however, is so well-known that it has been described by Merkur in 2002 as "perhaps the single most widely distributed ritual in Native North America . . . rivaled in distribution only by the smoking of the sacred pipe" (p. 150). Most commonly associated with young males, the vision quest, however, involves females in some tribes, such as the Ojibwa, as a variation of the rite, upon their first menstruation. As with the males, female fast in seclusion during their quest, but pray to be wives and mothers rather than hunters or shamans. The vision quest also has been described as a spiritual renewal for adult men, especially shamans or medicine men. Traditionally, the vision quest was a critical experience, involving fasting, prayer, and meditation for at least 4 days, with the young man traveling away from his community, perhaps to a sacred place in nature, culminating in a sign or signs that would clarify for a young adolescent the path he should follow for his future. Alternative explanations of the vision quest focus on connecting with a guardian spirit, usually an animal totem that would protect the individual in life challenges and dangers. Regardless, the vision quest can be seen as marking transition into adulthood for (typically male) adolescents; for a detailed example of the vision quest ritual and accompanying lore, Mekur's description of the Ojibwa vision quest is recommended. Associations between contemporary psychotherapy and the vision quest have been drawn because the vision quest can be seen as a transforming ritual similar to the process of traditional psychotherapy. For a discussion on the creative integration of the vision quest and other traditional Native American healing practices into current mental health treatment, the reader is referred to Heinrich and colleagues (1990). Furthermore, Suler has operationalized specific aspects of the vision quest, such as wandering and perceiving signs, and identified therapeutic qualities.

Older Adults: Views and Roles

Older adults often are revered in Native American cultures. Referred to as "elders" in many groups, typically they are respected as being wise, thoughtful, and the keepers of oral traditions. Theirs often is a special place of honor and access in ceremonies. Goins and colleagues suggest Native American elders in rural areas, such as most reservations, tend to have long-term residential stability. Perhaps consistent with an extended family orientation or economic factors, Native American elders, in comparison with the overall U.S. population, are more likely to be in households with greater numbers of people. Relatively little presently is known about health and social service utilization by Native American elders or about the status of caregiving for infirm Native American older adults.

A developmental consideration for women, typically for those who are older, is menopause. As reproductive capability changes, so may the woman's social roles and perspectives. A poetic, Native perspective on menopause by High (2003) is that the woman's body is its own "sweat lodge," consistent with "hot flashes" that can accompany this change in life. Interestingly, research

by Mingo and colleagues indicated that more traditional Navajo women were found to report fewer symptoms of menopause than their less traditional counterparts, similar to women from other ethnic groups who also were more traditionally focused.

STRENGTHS

Much is written about the health and social problems of Native Americans, and less focus is devoted to the many strengths and rich cultures of these groups. So, too, the diversity across American Indian and Alaska Native groups often is ignored, resulting in what Joseph Trimble has called an "ethnic gloss" that belies the unique cultural foundations of individual American Indian tribes and Alaska Native villages. Many of the tribes have their own governments, with sovereign lands, a constitution, credentialing of professionals, and licensing of vehicles with tribal nation tags, as some examples. The Iroquois Confederacy, in fact, provided a model for the formation of the United States in its uniting of the various states of the union. Rich visual arts (e.g., mask-making, beadwork, leatherwork) and performance art in storytelling, dance, and music provide a basis for contemporary and evolving art forms. Native Americans' ties to the land have provided a foundation for ecological approaches to the environment. In these and many other ways, the indigenous peoples of North America have exuded an often quiet, subtle, and humble strength.

CONCLUSIONS

As Native American groups, American Indians and Alaska Natives have social, psychological, and developmental processes, many of which are similar to those of the majority culture, but some of which are culturally unique. In concluding, it is important to highlight that there is great diversity among the American Indian and Alaska Native groups in the United States and elsewhere in North America. Additionally, there is considerable individual uniqueness within each of these groups. Consequently, any pan-Indian assumptions or conclusions should be viewed as hypotheses that may or may not fit with particular groups or individuals within that tribe or village group.

There are strengths to many Native American families in that there typically are strong kinship bonds and great loyalty in extended family networks. There frequently is a dedication to developing a strong sense of values and passing them on to future generations. Children are respected, valued, and involved with adults in social events. The roles of women and men, although somewhat different, are both appreciated. As a group, Native Americans are highly involved in military service. Native communities and groups such as the North American Iroquois Veterans Association accord great respect to soldiers, military veterans, and their families. Nature and natural things are valued. There is a sense of continuity in life and a connection among the earth and all peoples. Spirituality often is integrated throughout all aspects of life. Many Native Americans practice Christian traditions, others are involved in tribal spirituality, and some follow both these ways.

Native Americans have a rich and proud history despite several centuries of oppression beginning with European contact. Moreover, there is a vibrant contemporary culture, tied to sense of family, spirituality, and art, among other factors, that continues to develop and evolve.

—Daniel W. McNeil, Renata K. Martins, Elessa Clay High, Carol A. Markstrom, Rebecca K. Widoe, and Chebon A. Porter

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NATURAL CHILDBIRTH

Drs. Dick-Read, Lamaze, and Bradley independently developed what they termed "natural childbirth" practices in response to the hospital practices that developed in the mid-20th century. Although there are many variations on their methods, all natural childbirth practitioners, whether physician or midwife, are committed to the notion that birth, for a healthy pregnancy, is a natural event that women are fully capable of completing without complicated interventions. It is important to understand that natural childbirth practitioners do not question the use of medical intervention when either mother or baby is in distress (e.g., when preeclampsia or ruptured membranes without subsequent labor occurs). By following four general principles, natural childbirth practitioners strive to provide the healthiest birth possible for mother and child.

First, birth should begin on its own without artificial inducement. The advantages of allowing labor to begin on its own include an easier, less painful labor for the mother, reduced risk for prematurity because of miscalculation of the due date, fewer subsequent medical interventions including pain relief, and fewer cesarean deliveries.

Second, natural childbirth entails freedom of movement throughout labor and delivery. Traditional hospital practices encourage the woman to lie in bed during labor for the convenience of the staff and to deliver lying on her back (lithotomy or supine position). Maternal pain, particularly lumbar, is more intense in the supine position. Movement and position changes allow the uterus to work more efficiently, ease discomfort, and help the baby position itself more favorably in the birth canal. During delivery, either upright or side-lying positions are recommended. These positions, as compared with the lithotomy position, have been shown to reduce the time spent pushing, reduce the need for episiotomy, reduce maternal pain, and reduce fetal distress (when supine, the weight of the uterus constricts major blood vessels to the placenta).

Third, natural childbirth seeks to avoid routine interventions in the absence of medical indication. Research suggests that without clear need, these are more harmful than beneficial. Recommendations include allowing the mother to drink clear liquids and eat a light diet as needed for energy as opposed to the movement-constricting intravenous lines, periodic rather than continuous fetal monitoring, and avoidance of augmenting labor and routine epidural pain relief.

Continuous fetal monitoring restricts maternal movement, decreasing the efficiency of labor and natural pain relief and making synthetic augmentation and pain relief more likely. Although rupturing the amniotic sac does speed labor, it imposes a deadline for delivery because prolonged ruptured membranes increase likelihood of infection in both mother and baby. In the absence of clear necessity, early, manual rupture of the membranes is associated only with an increased cesarean delivery rate.

Oxytocin, the natural, maternal hormone that stimulates contractions signals the brain to release endorphins

to help ease labor. Synthetic hormones do not trigger release of endorphins; however, they do trigger longer, stronger, more painful contractions and must be administered intravenously, all making an epidural more likely.

Epidural pain relief is associated with prolonged labor, decreased pushing efficiency, increased temperature, and decreased blood pressure in the mother. The mother's difficulty pushing increases the likelihood of cesareans and forceps or vacuum extraction delivery. Because infection cannot be dismissed, increased maternal temperature is often associated with separation after birth of mother and baby. Finally, the decreased maternal blood pressure causes a drop in blood flow to the placenta, potentially causing fetal distress and necessitating an emergency cesarean delivery. Routine interventions form a spiral, with each increasing the likelihood of the next, all of which contribute to the escalating cesarean delivery rate.

Fourth, and perhaps most important, natural childbirth is committed to continuous support of the laboring woman. This can take various forms, including partners, family members, midwives, or doulas. The support provided ranges from assurance that labor is progressing normally, pain relief through counterpressure and massage, and suggesting changes in position. Women who receive continuous support throughout their labor deliver healthier, more alert babies, need fewer interventions, and have reduced medical expenses.

—Melinda C. R. Burgess and Brittney H. Schrick

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NATURALISTIC OBSERVATION

Naturalistic observation as an assessment method refers to the observation of a specified behavior, event, or situation in the setting in which such activities typically occur. This method emphasizes gathering observational data in normal, day-to-day conditions without observer intervention and striving to minimize any reactivity an observer's presence may cause. In comparison, other major observational methods depend on highly structured simulations of natural settings in which to observe specific behaviors or events (e.g., analogue observation), or participant-recorded observations (e.g., self-monitoring). Examples of typical settings that can be considered to be naturalistic include schools, homes, day care centers, and other community or institutional sites. Fundamental components of naturalistic observation include (a) observing and recording behavior/ events as they occur in their natural setting, (b) using trained and objective observers, and (c) utilizing a recording system that minimizes observer subjectivity.

Observing in natural settings has several advantages over other types of observational methods. Because the observations occur in routine and everyday settings, information gathered in such settings is a description of behavior, events, or situations as it occurs in a specific setting. Also, naturalistic observations are beneficial in initial stages of assessments, often providing information that will lead to the adoption of specific hypotheses to be tested.

While naturalistic observational methods provide a rich source of information, it is not always a possible, feasible, or ethical approach. A central issue in determining whether or not to use a naturalistic approach is that of "observability"; that is, how easily observed is the event, situation, or behavior. Observing in natural settings is not possible or practical if the variable of interest occurs infrequently (e.g., effectiveness of emergency tornado procedures). In such cases, contrived laboratory situations are often more effective methods to use. Additionally, there are a number of situations that would make naturalistic observations unsafe or unethical. For example, behaviors such as suicide attempts, fire setting, sexual assault, and illicit drug use cannot ethically be allowed to occur in order to gather observational data. Another limitation of the naturalistic observational method is that it primarily yields descriptive information and does not allow one to draw conclusions regarding cause and effect. Additional assessment techniques would need to be combined with observational data in order to confirm causal relationships.

There are a number of different recording techniques that are available when conducting naturalistic

Table 1 Selecting Observational Recording Methods

Recording Method	*Definition*	*Advantages/ Disadvantages*
Anecdotal Recording	Narrative description of events or behavior	A: Can record unanticipated events, requires little training D: Subject to bias, difficult to summarize
Event Recording	Record of specific events or behavior during a given period	A: Can track changes in behavior over time, facilitates analysis D: Difficult to use with behavior/ events that occur frequently
Interval Recording	Record of events or behavior that occurs during prespecified time intervals	A: Good for behavior that occurs frequently, can observe multiple behaviors at same time D: Requires concentration and attention of observer, does not provide exact count of behaviors
Duration/ Latency Recording	Record of how long specific events/behaviors last (duration), and the time between the end of one behavior and the beginning of another (latency)	A: Easy to do with a clock or stopwatch D: Difficult with events/behaviors without clear beginnings and endings

observations. The selection of a specific technique depends upon the nature of what is to be observed (e.g., frequency, location, who will be observing) and the question that initiated the observations. Table 1 provides a brief summary of the main types of recording procedures.

—Stephen R. Lassen

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NATURE–NURTURE

NATURE, NURTURE, AND THE DEVELOPMENT OF ORGANISMS

With increasing frequency, the media report the discovery of a gene "for" some distinct human characteristic, such as athletic prowess or male promiscuity. Yet it is obvious that experience, education, and culture make a big difference regarding how people behave, whatever their genetic inheritance. Why is it that given human characteristics are so often explained in terms of the exclusive importance of one set of factors, either genetic or environmental? Oversimplified opinions may derive from a style of advocacy that is common in many academic debates. If Dr. Jones has overstated her case, for example, then Professor Smith feels bound to redress the balance by overstating the counterargument. The confusions are amplified because of the way in which scientists analyze complex processes. When somebody has conducted a clever experiment demonstrating an important long-term influence on the adult organism, that person has good reason to feel pleased. It is easy to forget, however, about all those other influences that a competent scientist contrives to keep constant or play no systematic role. Consequently, debates about development often degenerate into sweeping assertions about the overriding importance of genes (standing in for "nature") or the crucial significance of the environment (which then becomes "nurture").

Even if the debates are seen for what they are—irritating examples of advocacy—is it not the case that

the organization of the adult organism has to come from somewhere? In some cases, surely, it will be inborn, and in other cases it will be dependent on the environment. From this seemingly plausible dichotomy has been born and reborn many times the idea, for example, that much of human behavior is instinctive, to be set against that which is acquired from copying others or by trial and error. Studies of animal behavior do, indeed, tell us that much complex behavior can develop without opportunities for practice. The European garden warblers that have been hand-reared in cages nevertheless become restless and attempt to fly south in the autumn—the time when they would normally migrate southward. The warblers continue to be restless in their cages for about a couple of months, the time taken to fly from Europe to their wintering grounds in Africa. The following spring, they attempt to fly north again. This migratory response occurs despite the fact that the birds have been reared in social isolation, with no opportunities to learn when to fly, where to fly, or for how long: a marvel, but not a special marvel, just because behavior is involved. The inheritance of what is needed and the development of the requisite rules need be no more problematic than building a kidney. Examples like this should not lead to simplistic dichotomies.

One of the triumphs of behavioral biology in the latter part of the 20th century was to relate differences in mating systems, parental behavior, foraging, and many other aspects of adult behavior to differences in ecology. This brought coherence to a field that had provided a collection of attractive cases for television programs but did not otherwise seem related to each other. Comparable coherence can be brought to the great variation in the ways in which adult characteristics can develop. Systems that serve different biological functions would not be expected to develop in the same way. In particular, the role of experience is likely to vary considerably from one system to another. In predatory species, capturing fast-moving prey requires considerable learning and practice to be successful. The osprey snatching trout from water does not develop that ability overnight. Animals that rely on highly sophisticated predatory skills, such as birds of prey, suffer high mortality when young as a result of their incompetence, and those that survive are often unable to breed for years; this is because they have to acquire and hone their skills before they can capture enough prey to feed offspring in addition to themselves. In such cases, a combination of different developmental processes is required to generate the highly tuned skills seen in the adult. What we should conclude, then, is that if we want to understand developmental processes, we have no alternative but to study them.

GENES MATTER

Plant and animal breeders know well that many of the characteristics that matter to them are inherited, in the sense that a new set of progeny will resemble individuals in the ancestral pedigree of that plant or animal more than they resemble progeny from some other pedigree. Long before genes were postulated and DNA was discovered, breeders took this as a bountiful fact of life, even though they had no idea how inheritance worked. To take just one example, dogs have for many centuries been bred for their behavioral characteristics as well as their appearance. The sheepdog is especially sensitive to the commands of humans, waiting until the shepherd gives it a signal to start herding the sheep. Another breed, the pointer, behaves in a way that helps the hunter. When the pointer detects the smell of a game species such as a grouse, the dog stops in its tracks, stiffly orientated towards the bird. Valued behavioral characteristics such as these are clearly inherited, do not need to be taught (at least, not in their most basic form), and are quickly lost if breeds are crossed with others. Humans may also reveal through their children how particular characteristics are inherited. Two healthy parents from a part of the world where malaria is rife may have a child who develops severe anemia. Both parents carry a gene that does have some effect on red blood cells, protecting them against the malarial parasite that enters red blood cells for part of its life cycle. However, a double dose of this recessive gene leads to the red blood cells collapsing from their normal disc shape into strange sickle-like shapes. The child who receives this genetic legacy has sickle cell anemia.

Few behavioral characteristics are inherited in as simple a fashion as sickle cell anemia, and, when they are, the effects are usually damaging and pervasive. A well-known case is the disabling disease phenylketonuria (PKU). If a child inherits two copies of a particular recessive gene from both its parents, it cannot produce a crucial enzyme required to break down phenylalanine, an amino acid that is a normal component of the average diet. The resulting accumulation of phenylalanine in the body poisons the child's

developing brain and causes severe mental retardation—unless the condition is diagnosed and the child is given a special diet.

Evidence for genetic influences on human behavior is usually indirect. It is bound to be so because naturally occurring breeding experiments are rare, and deliberate breeding experiments in the interests of genetic research would obviously be intolerable in most societies. What is more, many genes are involved in the great majority of family likenesses, whether physical or behavioral. However, some light is cast on the links between genes and behavior by the study of twins.

Research into the inheritance of human behavior has been greatly helped by comparing genetically identical twins with nonidentical twins. Identical (or monozygotic) twins are genetically identical because they are derived from the splitting of a single fertilized egg. They are naturally occurring clones. Nonidentical (or dizygotic) twins, in contrast, develop from two fertilized eggs. Consequently, they are no more similar to each other genetically than any two siblings born at different times. In the Western world, about 1 in 83 births are twins, of which one third are identical twins. If identical twins are no more alike than nonidentical twins in a given behavioral characteristic, then this suggests that the genetic influence on that characteristic is weak. Conversely, when identical twins are substantially more alike than nonidentical twins (or siblings), then the mechanism of inheritance is likely to be through the nuclear genes.

Another way of exploring how genes influence adult characteristics is to compare twins who have been reared apart (because one or both of them has been adopted soon after birth) with twins who have been reared together. The thought behind this approach is that separation in early infancy removes the influence of the shared environment, leaving only the inherited factors. The thought is not wholly correct, however, because even twins who are separated immediately after birth will have shared a common environment for the first crucial 9 months after conception, while they are together in their mother's womb. This obvious truth can add to the difficulties of sorting out the sources of individual distinctiveness. Moreover, being separated at birth and raised in environments that are assumed to be different do not preclude the possibility that their environments may in fact have many important features in common.

Nevertheless, the appearance, behavior, and personality of identical twins who have been reared apart are often startlingly similar. In one documented case, for example, a pair of twins had been separated early in life, one growing up in California, the other in Germany. Yet when they met for the first time in 35 years, they both arrived wearing virtually identical clothes and with similar clipped moustaches, both had a habit of wrapping elastic bands around their wrists, and both had the idiosyncratic habit of flushing lavatories before as well as after using them.

Accounts such as these are sometimes greeted with skepticism because it is suspected that only the startling matches have been reported while the discrepant twins have been ignored in the interests of a good story. Nevertheless, some properly conducted statistical surveys have revealed that, on a range of measures of personality, identical twins who have been reared apart are more like each other than nonidentical twins also reared apart. When making such comparisons it does not matter whether, as has often been argued, the measures of behavioral characteristics are crude and relatively insensitive. Although differences are less likely to be found with insensitive behavioral measures, differences are found. The inescapable conclusion is that some observable aspects of individuals' behavior are influenced by inherited factors.

EXPERIENCE MATTERS

Even the most cursory glance at humanity reveals the enormous importance of each person's experience, upbringing, and culture. Look at the astonishing variation among humans in language, dietary habits, marriage customs, child care practices, clothing, religion, architecture, art, and much else besides. Nobody could seriously doubt the remarkable human capacity for learning from personal experience and learning from others. Similarly, nutrition has an enormous effect on human characteristics. The average adult height of males in United States has been rising at the rate of about 1 centimeter a decade for the past 100 years. In Japan, the rate since the Second World War has been about 3 centimeters per decade. These effects have been largely achieved through improvements in the nutritional state of the mother, which then affect the unborn fetuses.

Early educational intervention can also benefit the disadvantaged child, but in ways that had not been fully anticipated. In the 1960s, great efforts were made in the United States to help people living in difficult and impoverished conditions. A large government

program known as Head Start was designed to boost children's intelligence by giving them educational experience before starting school. The Head Start program did not seem to have the substantial and much hoped for effects on intelligence, as measured by intelligence quotient (IQ). Children who had received the Head Start experience displayed an initial, modest boost in their IQ scores, but these differences soon evaporated after a few years. The fashionable response was to disparage such well-meaning efforts to help the disadvantaged young.

Later research, however, has revealed that some of the other effects of the Head Start experience were long lasting and of great social significance—greater, in fact, than boosting IQ scores. Several long-term follow-up studies of children who had received preschool training under Head Start found that they were distinctive in a variety of ways, perhaps the most important being that these individuals were much more community minded and less likely to enter a life of crime. Head Start produced lasting benefits for the recipients and society more generally, but not by raising raw IQ scores. Evidence for the long-term benefits of early educational intervention has continued to accumulate. Studies like these raise many questions about the ways in which early experiences exert their effects, but they do at least show how important such experiences can be.

Even relatively subtle differences in the way children are treated at an early age can have lasting effects on the way they behave years later. One study compared the long-term effects of three different types of preschool teaching. In the first type, 3- and 4-year-olds were given direct instruction, with the teacher initiating the children's activities in a strict order. The second type of teaching was a traditional nursery school in which the teachers responded to activities initiated by the children. In the third, known as High/Scope, the teachers involved the children in planning their own activities, but arranged the classroom and the daily routine so that the children could do things that were appropriate to their stage of development.

Striking differences were found between the children as they grew up. When followed up at the age of 23, the individuals who had been in the direct instruction group were worse off in a variety of ways than those in the other two groups. In particular, they were more likely to have been arrested on a criminal charge and more likely to have received special help for emotional impairment. In comparison, people who had received the more relaxed type of preschooling were more likely to be living with spouses and much more likely to have developed a community spirit.

UNDERSTANDING THE INTERPLAY

The importance of both genes and environment to the development of all animals, including humans, is obvious. This is true even for apparently simple physical characteristics, let alone complex psychological variables. Take myopia (or short-sightedness), for example. Myopia runs in families, suggesting that it is inherited, but it is also affected by the individual's experience. Both a parental history of myopia and, to a lesser extent, the experience of spending prolonged periods studying close-up objects will predispose a child to become short-sighted.

A more interesting case is musical ability, about which strong and contradictory views are held. Popular beliefs about the origin of special talents are generally that they are inherited. Dissociation between general intellectual capability and musical ability is strongly suggested by the phenomenon of the musical idiot savant—an individual with low intelligence but a single, outstanding talent for music. Such people are usually male and often autistic. Their unusual gift—whether it is for music, drawing, or mental arithmetic—becomes apparent at an early age and is seldom improved by practice. One typical individual could recall and perform pieces of music with outstanding ability and possessed almost perfect pitch; he had poor verbal reasoning, but his low intellectual ability was to some degree offset by high levels of concentration and memory. However, children who are good at music also tend to be good at reading and have a good sense of spatial relations, even after taking account of variables such as age and IQ.

The main factors fostering the development of musical ability form a predictable cast: a family background of music; practice (the more the better), practical and emotional support from parents and other adults, and a good relationship with the first music teachers. Practice is especially important, and attainment is strongly correlated with effort. A rewarding encounter with an inspirational teacher may lock the child in to years of effort; conversely, an unpleasant early experience may cause the child to reject music, perhaps forever. Here, as elsewhere, chance plays a role in shaping the individual's development.

Research on identical and nonidentical twins has shown that the shared family environment has a substantial influence on the development of musical ability, whereas inherited factors exert only a modest effect. Genetically identical twins are only slightly more alike in their musical ability than nonidentical twins or siblings. A study of more than 600 trainee and professional musicians analyzed the origins of perfect (or absolute) pitch—that is, the ability to hear a tone and immediately identify the musical note without reference to any external comparison. Heritable factors appeared to play a role: musicians with perfect pitch were four times more likely than other musicians to report having a relative with perfect pitch. But the same study also found that virtually all the musicians with perfect pitch had started learning music by the age of 6. Of those who had started musical training before the age of 4, 40% had developed perfect pitch, whereas only 3% of those who had started training after the age of 9 possessed the ability. Early experience is also important.

Like many other complex skills, musical ability develops over a prolonged period, and the developmental process does not suddenly stop at the end of childhood. Expert pianists manage to maintain their high levels of musical skill into old age despite the general decline in their other faculties. They achieve this through copious practice throughout their adult life; the greater the amount of practice, the smaller the age-related decline in musical skill. Practice not only makes perfect, it maintains perfect.

Is it possible to calculate the relative contributions of genes and environment to the development of adult characteristics? Given the passion with which clever people have argued over the years that either the genes or the environment is of crucial importance in development, it is not altogether surprising that the outcome of the nature–nurture dispute has tended to look like an insipid compromise between the two extreme positions. Instead of asking whether a characteristic is caused by genes or caused by the environment, the question instead became, "How much is due to each?" Within a single individual, this question cannot be answered, but it can be posed for a population of individuals as follows: "How much of the variation between individuals in a given character is due to differences in their genes, and how much is due to differences in their environments?"

The nature–nurture controversy appeared at one time to have been resolved by what seemed like a neat solution to this question about where differences come from. The suggested solution was provided by a measure called *heritability*. The meaning of heritability is best illustrated with an uncontroversial characteristic such as height, which is clearly influenced by both the individual's family background (genetic influences) and nutrition (environmental influences). The variation between individuals in height that is attributable to variation in their genes may be expressed as a proportion of the total variation within the population sampled. This index is known as the *heritability ratio*. If people differed in height solely because they differed in their genes, the heritability of height would be 1.0; if, on the other hand, variation in height arose entirely from individual differences in environmental factors such as nutrition, then the heritability would be 0.0.

Calculating a single number to describe the relative contribution of genes and environment has obvious attractions. Estimates of heritability are of undoubted value to animal breeders, for example. Given a standard set of environmental conditions, the genetic strain to which a pig belongs will predict its adult body size better than other variables such as the number of piglets in a sow's litter. If the animal in question is a cow and the breeder is interested in maximizing its milk yield, then knowing that milk yield is highly heritable in a particular strain of cows under standard rearing conditions is important.

Behind the deceptively plausible ratios lurk some fundamental problems. For a start, the heritability of any given characteristic is not a fixed and absolute quantity—tempted though many scientists have been to believe otherwise. Its value depends on a number of variable factors, such as the particular population of individuals that has been sampled. For instance, if heights are measured only among people from affluent backgrounds, then the total variation in height will be much smaller than if the sample also includes people who are small because they have been undernourished. The heritability of height will consequently be larger in a population of exclusively well-nourished people than it would be among people drawn from a wider range of environments. Conversely, if the heritability of height is based on a population with relatively similar genes—say, native Icelanders—then the figure will be lower than if the population is genetically more heterogeneous—for example, if it includes both Icelanders and African Pygmies. Thus, attempts to measure the relative contributions of genes and environment to a particular characteristic are highly dependent on who is measured and in what conditions.

Another problem with the heritability ratio is that it says nothing about the ways in which genes and the environment contribute to the processes involved in an individual's development. This point becomes obvious when considering the heritability of a characteristic such as "walking on two legs." Humans walk on less than two legs only as a result of environmental influences such as war wounds, car accidents, disease, or exposure to teratogenic toxins before birth. In other words, all the variation within the human population results from environmental influences, and consequently the heritability of walking on two legs is 0.0. Yet walking on two legs is clearly a fundamental property of being human and is one of the more obvious biological differences between humans and great apes such as chimpanzees or gorillas. It obviously depends heavily on genes, despite having a heritability of 0.0. A low heritability clearly does not mean that development is unaffected by genes.

If a population of individuals is sampled and the results show that one human characteristic has a higher heritability than another, this merely indicates that the two characteristics have developed in different ways. It does not mean that genes play a more important role in the development of the characteristic with the higher heritability. Important environmental influences might have been relatively constant at the stage in development when the more heritable characteristic would have been most strongly affected by experience.

The most serious shortcoming of heritability estimates is that they rest on the spurious assumption that genetic and environmental influences are independent of one another and do not interact. The calculation of heritability assumes that the genetic and environmental contributions can simply be added together to obtain the total variation. In many cases, this assumption is clearly wrong. One surprising conclusion to emerge from studies of identical twins is that twins reared apart are sometimes more like each other than those reared together. To put it another way, rearing two genetically identical individuals in the same environment can make them less similar rather than more similar because one of the twins is dominant to the other, entering the room first and speaking for them both. This fact pleases neither the extreme environmental determinist nor the extreme genetic determinist. The environmental determinist supposes that twins reared apart must have different experiences and should therefore be more dissimilar in their characteristics than twins who grew up together in the same environment. The genetic determinist does not expect to find any differences between genetically identical twins who have been reared together. If they have had the same genes and the same environment, then how can they be different?

Siblings are less like each other than would be expected just by chance. The child picks a niche for itself, not on the basis of its own characteristics but on what its siblings have done. Children seek out their own space. When Mary did well at art, her younger sister Susan would not have anything to do with drawing or painting, even though she would probably have been good at both. When Henry developed a flair for history and languages, George inclined toward math and science. Most parents with more than one child can tell such stories. Such interplay between siblings probably accounts for some of the influences of birth order. Individual differences emerge because children are active agents in their own development. Other things are also at work, of course. Parents treat their successive children differently—sometimes deliberately, sometimes unwittingly. They often have a more taut relationship with their first child than with later-born children, being more anxious and controlling. They are usually more relaxed, positive, and confident with their subsequent children, and their preoccupation with every detail of their children's behavior and appearance lessens. These examples emphasis how important it is that we look carefully at the transactions between the developing child and the social and physical worlds in which he or she lives.

WHAT IS THE SOLUTION?

Any scientific investigation of the origins of human differences eventually arrives at a conclusion that most nonscientists would probably have reached after only a few seconds' thought. Genes and the environment both matter. How much each of them matters defies an easy answer, and we have to accept that no simple formula can solve that conundrum. The answer to the question of where human differences come from will not be generated by the conventional opposition between nature (genes) and nurture (environment). The answer requires understanding of the biological and psychological processes that build a unique adult from a fertilized egg.

As attention is focused on development, more and more will be learned about the underlying processes. Many of these processes will have regularities that will be amenable to analysis. It does not follow that,

as these regularities are uncovered, humans will become more predictable. To understand why, consider a rule-governed game like chess. It is impossible to predict the course of a particular chess game from knowledge of the game's rules. Chess players are constrained by the rules and the positions of the pieces in the game, but they are also instrumental in generating the positions to which they must subsequently respond. The range of possible games is enormous. The rules may be simple, but the outcomes can be extremely complex.

Nothing happens in isolation. The products of genes, the impact of experience, and the resulting activities of neurons are all embedded in elaborate networks. In an analogous way, many different design features of a motorcar contribute to a particular characteristic such as its maximum speed. A particular component such as the system for delivering fuel to the cylinders may affect many different aspects of the car's performance, such as its top speed, acceleration, and fuel consumption. A disconnected wire can cause a car to break down, but this does not mean that the wire by itself is responsible for making the car move.

The idea that genes might be likened to the blueprint of a building is hopelessly misleading because the correspondences between plan and product are not to be found. In a blueprint, the mapping works both ways. Starting from a finished house, the room can be found on the blueprint, just as the room's position is determined by the blueprint. This straightforward mapping is not true for genes and adult characteristics, in either direction. The language of a gene "for" a particular human characteristic, so often used by scientists is exceedingly muddling to the nonscientist (and, if the truth be told, to many scientists as well). What the scientists mean (or should mean) is that a genetic difference between two groups is associated with a difference. They know perfectly well that other things are important and that, even in constant environmental conditions, the developmental outcome depends on the whole gene "team." Particular combinations of genes have particular effects, in much the same way as a particular collection of ingredients may be used in cooking a particular dish; a gene that fits into one combination may not fit into another. Unfortunately, the language of genes "for" characters has a way of seducing the scientists themselves into believing their own sound bites. Nevertheless, it is likely that order underlies even those learning processes that make people different from each other. Knowing something of the underlying regularities in development does bring an understanding of what happens to the child as it grows up. The rules influence the course of a life, but they do not determine it. Like chess players, children are active agents. They influence their environment and are in turn affected by what they have done. Furthermore, children's responses to new conditions will, like chess players' responses, be refined or embellished as they gather experience. Sometimes normal development of a particular ability requires input from the environment at a particular time; what happens next depends on the character of that input. The upshot is that, despite their underlying regularities, developmental processes seldom proceed in straight lines. Big changes in the environment may have no effect whatsoever, whereas some small changes have big effects. The only way to unravel this is to study what happens.

SUMMARY

Both genes and the environment shape development. It is rarely helpful to partition the relative importance of the two main groups of shaping factors because they are not usually additive in their effects. Developmental processes are dynamic.

—Patrick Bateson

See also Development, Theories of Development

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NEIGHBORHOODS

Neighborhoods typically refer to the immediate geographical area surrounding a family's place of residence, bounded by physical features of the environment such as streets, rivers, train tracks, and political divisions. Definitions of neighborhoods also typically involve a strong social component, characterized by social interaction between neighbors, a sense of shared identity, and similar demographic characteristics such as stage in the life and socioeconomic status.

William J. Wilson has been influential in focusing research attention on the role of neighborhoods in human development through his theory of the "new urban poor." Wilson argues that the experience of poverty is more detrimental to poor families and youth today than it was in the past owing to changes in the structure of the neighborhoods in which these families live. Today, poverty is more highly concentrated, and thus the poor tend to reside in neighborhoods composed mostly of other poor families. This concentration of poverty and the adult joblessness that accompanies it lead to the social isolation of poor children from role models of mainstream routes to success, such as higher education and stable employment, and make alternative and frequently deviant routes more appealing.

Other researchers have begun to demonstrate that neighborhoods are associated with a wide range of outcomes across the life course. Their influence begins at birth, with neighborhoods found to be significantly related to low birth weight and infant mortality, and for outcomes typically thought to represent individual differences or traits, such as intelligence quotient (IQ) and temperament. In childhood and adolescence, neighborhoods have been found to shape aggression, delinquency, and substance use as well as positive outcomes such as high school completion, grades, community involvement, and psychological well-being. Neighborhoods have also been found to influence adult outcomes, including child abuse, single parenthood, educational attainment, crime and substance use, employment and earnings, and general well-being.

What is it about a neighborhood that makes a difference in the lives of youth? One answer is the neighbors. Nearly all neighborhood studies find that the demographic or socioeconomic characteristics of neighbors are associated with the outcomes of interest. In Wilson's theory, for example, living in neighborhoods with many poor families is argued to cut youth off from mainstream society and lead to undesirable outcomes, such as violence and delinquency. Other research emphasizes the benefits of high socioeconomic status neighbors for promoting prosocial outcomes and educational attainments. Other demographic features of a neighborhood thought to be important include its racial and ethnic composition or heterogeneity, the frequency with which people move in and out, family and household types (e.g., presence of single-parent families), and the density and crowding of housing.

The nature of social relationships within the neighborhood is perhaps the most important way that neighborhoods influence child and family life. Robert Sampson and colleagues have shown, for example, that the degree to which adults in a neighborhood possess "collective efficacy"—a sense that they can collectively achieve shared goals—is associated with lower rates of delinquency and violence. Collective efficacy involves several subcomponents, including shared goals about child rearing, trust of one's neighbors, reciprocal exchanges of favors, and a willingness to informally monitor and sanction local youth. Of course, social relationships within disadvantaged neighborhoods may enable undesirable outcomes as well, as in the case of youth gangs or deviant peer groups. Thus, the influence of a given neighborhood relationship depends on the outcome being considered, who is talking, what they are talking about, and the resources to which each of the persons in the relationship have access.

In addition to relationships within the neighborhood, the degree to which adults and other members of the community are connected to persons and institutions outside of the neighborhood is equally important. From an information-gathering perspective, relationships within the neighborhood may provide little new information, such as about how to apply to college or about employment opportunities in other parts of the city. In contrast, relationships between residents and institutions of the larger community, sometimes referred to as "bridging ties," provide access to a richer information network, including opportunities beyond the confines of the immediate neighborhood. A related issue is a neighborhood's position within the larger metropolitan or regional political economy. Neighborhoods located within traditionally poor and underserved areas of a city, for example, typically have less political power to effect change.

The quality of public institutions and services in the neighborhood is an important influence on the lives of

families and children. Good schools, day care, health care facilities, police protection, libraries, and parks are but a few of the important institutions that families think about when choosing neighborhoods in which to live. Although schools and neighborhoods are typically studied in isolation from one another, the reality is that schools are a critical resource within neighborhoods and an important mechanism through which neighborhoods influence children. Aspects of schools typically studied include their socioeconomic status, disciplinary climate, organizational hierarchy, tracking, and the degree to which higher education is emphasized.

Neighborhoods may also present threats to the lives of families and children. Perhaps most damaging is exposure to community violence, which is believed to undermine children's belief in a predictable world and their ability to effectively respond. Constant attention to daily survival distracts youth from learning opportunities and erodes their faith that they will even survive into adulthood, making planning and investments in long-term pursuits such as education less meaningful. Physical signs of community disorder, such as graffiti, trash, or abandoned buildings, have similarly been found to diminish residents' sense of control and psychological well-being. Neighborhood poverty and violence are also frequently accompanied by family violence and child maltreatment, further undermining the life chances of youth.

One frequent limitation of neighborhood studies is that they assume neighborhoods to have the same effect on all residents and that the direction of causal influence flows in one direction, from the neighborhood to the youth or family. An ecological approach to human development, in contrast, recognizes that the relationship between neighborhoods and families is inherently interactive, with developmental outcomes a joint function of the characteristics of each. From this perspective, the experience of a family cannot be understood without taking into account the social context of the neighborhood in which it is embedded. Similarly, the influence of a neighborhood on families must take into account the diversity of youth and families within it, and that each may experience and respond to the neighborhood differently.

Although fewer neighborhood studies have taken such an approach, there is evidence for the ecological model. Research has found, for example, that high socioeconomic status neighborhoods may magnify the benefits of coming from higher socioeconomic status families by helping such youth maximize their potential. Other studies suggest that the resources of good neighborhoods are most beneficial to youth from families without those resources. Wilson, for example, argues that middle-class neighbors serve as social buffers or a safety net for disadvantaged youth, acting as role models of mainstream routes to success and monitoring and sanctioning behavior. Still others have argued that living in high-resource neighborhoods may have detrimental effects on poor youth because of their disadvantages in competitions for scarce resources, negative self-appraisals, or social comparisons to more advantaged youth.

An ecological approach also recognizes that families are not passive consumers of the neighborhood. Within dangerous neighborhoods, for example, parents play an active role in managing their children's exposure to neighborhood peers, violence, and other risks. Common protective strategies include restricting youth's access to particularly dangerous areas, setting curfews, constraining children's friendships, avoiding neighbors, chaperoning children's activities, and other forms of vigilant monitoring.

The fact that parents choose or select the neighborhoods in which they live is a serious methodological challenge to neighborhood research. Like many other areas of social science research, it is usually not possible or ethical to conduct formal experiments in which families are randomly assigned to neighborhoods. Thus, what researchers think are neighborhood effects may simply reflect the differential ability or concern of parents to choose their neighborhoods. Few studies adequately address the problem. Most studies attempt to address the selection issue by statistically controlling for variables associated with a parent's ability to select their neighborhood.

The best evidence of causal neighborhood effects comes from the quasi-experimental Gautreaux Assisted Housing Program. In this program, families on waiting lists for public housing assistance were randomly assigned to two types of housing: scattered housing in the suburbs and more typical inner-city housing projects. Many years later, research found that families given access to housing in the suburbs were doing better in terms of both the mother's employment prospects and the children's educational attainment. Encouraged by the success of the Gautreaux program, the U.S. Department of Housing and Urban Development is currently funding the Moving to Opportunity Demonstration Project, the results of which are, to date, mostly positive.

—Raymond R. Swisher

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NEONATAL BEHAVIORAL ASSESSMENT SCALE

For much of the earlier part of the 20th century, it was assumed that the newborn infant was indeed a "blank slate," a reflex organism, operating at a brainstem level, so that newborn assessment scales reflected these assumptions. These earlier neonatal scales focused on the assessment of the so-called primitive reflexes and postural reactions (e.g., Peiper, 1924; Andre-Thomas, 1960; Prechtl and Beintema 1964; Sainte-Dargassies, 1977). However, a new body of research on newborn capabilities in the 1960s and 1970s and the introduction of the concept of "newborn behavioral state" by Wolff led to a greater appreciation of the human newborn as a responsive organism, capable of organized behavior, which, in turn, contributed to the development of a new generation of neonatal scales. The single most important advance in the study and assessment of the newborn infant was the development and publication of the Neonatal Behavioral Assessment Scale (NBAS) by T. Berry Brazelton and his colleagues in 1973. Because it yields a comprehensive description of newborn competencies, on the one hand, and identifies individual differences in newborn behavior, the NBAS can be said to begin where other scales left off.

The NBAS consists of 28 behavioral items, which measure the infant's behavioral capacities, and 16 reflex items, which measure the infant's neurological status. Never conceptualized as an objective assessment in the classic psychometric or medical diagnostic tradition, with an emphasis on pass/fail criteria, the NBAS is based on a broader appreciation of the complexity of newborn behavior and emphasizes the role of the examiner in eliciting the baby's "best performance." Examiners must be trained to use the scale. The scale describes the infant's functioning in seven key areas: *habituation*—the infant's ability to respond to and inhibit discrete stimuli while asleep; *orientation*—the newborn's ability to attend to visual and auditory stimuli; *motor*—motor performance and the quality of movement and tone; *range of state*—infant arousal and state lability; *regulation of state*—the infant's ability to regulate his or her state in the face in increasing levels of stimulation; *autonomic stability*—signs of stress related to homeostatic adjustments of the central nervous system; and finally, *reflexes*. In the most recent edition of the NBAS, a set of supplementary items was added in an attempt to better capture the range and quality of the behavior of high-risk infants.

The NBAS has been used in studies of intrauterine growth retarded and premature infants and in studies of the effects of prenatal and perinatal factors, such as the prenatal ingestion of cocaine, alcohol, caffeine, and tobacco. The NBAS is also used to examine the effects of newborn behavior on the parent-child relationship and as an educational tool with parents. It has also been used extensively in cross-cultural studies. The NBAS has, in turn, stimulated the development of a number of scales for use with different populations and in different settings. For example, Als and colleagues, in 1989, used the concepts of the NBAS to develop the Assessment of the Premature Infant's Behavior (APIB), an assessment of the behavior of the preterm infant, whereas Lester and Tronick, in 2004, used the NBAS as the basis for the Neonatal Intensive Care Unit Network Neurobehavioral Assessment Scale (NNNS). Keefer developed the PEBE in 1995 (the combined physical and behavioral neonatal examination), whereas Cardone and Gilkerson, in the same year, also used the concepts of the NBAS to develop the Family Administered Neonatal Activities (FANA). The Newborn Behavioral Observations (NBO) also comes from this tradition and was developed by Nugent, Keefer, O'Brien, Johnson, and Blanchard in 2005 as a relationship-building instrument

to sensitize parents to the capacities and individuality of the newborn infant and to foster the relationship between clinicians and parents.

The NBAS remains the most comprehensive assessment of newborn behavior available, and as such, it can be said to have played a major role in expanding our understanding of the phenomenology of newborn behavior among researchers and clinicians alike.

—J. Kevin Nugent

See also Brazelton, T. Berry; Infancy; Reflexes

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NEONATE

The neonate exists in a developmental stage in which many of the adaptations of the fetus are no longer relevant to the survival demands of postnatal life. Consequently, the neonate is presented at the moment of birth with a dramatically altered set of challenges, most particularly managing to maintain physiological homeostasis outside of the mother's uterus. The focus of this essay is on recent breakthroughs in the understanding of this amazing feat.

The limitations and capacities of the neonate in adjusting to life outside the womb suggest that this developmental period is truly unique, and that it is no surprise that important psychological processes become organized in the first 3 months of life. During the prenatal to postnatal transition, many systems are differentiating and emerging in form and function. For example, sensory systems, at various levels of maturation, are prepared to operate at birth with some efficiency, particularly the senses of touch, olfaction, and taste and the auditory system. Conversely, the visual system in the human neonate, as opposed to most primates, is relatively immature, requiring several months for complex functions such as acuity and accommodation to come on board. However, perceptual understanding of the environment is primitive.

Although there is much debate concerning the degree to which neonates appreciate object properties, there is evidence that infants exhibit preparedness to respond to certain cues with great competency. For example, in many cases, a few minutes after birth, infants are capable of responding rapidly to the cues for suckling. Using olfactory and touch cues, the neonate orients to the mother's breast, searches and attaches to the nipple, and suckles efficiently enough to feed. It is known from examining fetal behavior that the complex sequence of neonatal reflexes observed in the first feeding encounter has been carefully prepared in fetal life to ensure success. Further, infants are capable of associative learning under certain circumstances, particularly in relation to maternal exchanges.

Hence, as the neonate becomes experienced with feeding, competencies improve and reliance on neonatal reflexes such as rooting becomes integrated with the unique features of the maternal sensory environment. With regard to prenatal preparation and conditioning, the neonate soon after birth recognizes and responds to the unique features of the mother's voice. With the auditory cue only, neonates can select their own mother from other mothers who have just given birth, and even show a preference for the prenatal language of exposure.

Nonetheless, perception of the world around the neonate is limited by developmental immaturity in neurocognitive processes. With regard to brain development, the cortex is still extremely immature during the first 3 months, as indicated by neuroimaging, and this is reflected in the limitations of the newborn's cognitive understanding and memory function. Neuroplasticity as an experience-dependent process is in high gear during infancy. It has become increasingly clear that the nature of neonatal experiences is both necessary and directive in the processes of central nervous system plasticity and, in fact, sculpts the nervous system in profound ways.

Behavioral systems for regulating cardiorespiratory function, food intake, and thermoregulation become activated to maintain the health and well-being of the child. However, motor systems have poor differentiation of movements (with the exception of neonatal reflexes), relative weakness, and complex tone that is unique and different from earlier or later ages. Most of the time, the neonate is asleep (about 18–22 hours per day) and expresses a noncircadian distribution. Waking is brief and associated with feeding episodes, which vary in period based on mode (breast versus bottle) but average about 2 to 3 hours. Toward the end of the neonatal phase, alertness improves, as does the distribution of sleep to the nocturnal phase.

To communicate with caregivers, the neonate uses crying as the distress signal for any dysfunction in the capacity of his or her regulatory efforts. Social relationships that begin early in life with primary caregivers, such as with parents, are ideally characterized by continuity from this stage to the next. In the attachment process, it is the parent, rather than the infant, who is capable of maintaining proximity. Neonates are best soothed by skin-to-skin contact and being held frequently and for long periods. Social contact with primary caregivers at this age contributes to the development of attachment specificity by 4 to 8 months. The type and intensity of psychological stimulation required for rapidly growing motor, sensory, emotional, and cognitive domains is most supported by social contact. The unifying concept throughout this and later infancy stages is the dynamic interaction between maturational-genetic and environmental factors that influence both immediate and long-term trajectories of psychological growth.

—Marie J. Hayes and Michio Fukumizu

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NEUROTRANSMITTERS

Neurotransmitters are the molecules used by neurons to transmit information. They are synthesized from ingested foods, as well as endogenous amino acids and other molecules. Neurotransmitters are used throughout the life span as a method of communication throughout the body, in both the central nervous system (the brain and spinal cord) and the peripheral nervous system (all other nervous tissue throughout the body). These molecules are released from one neuron, commonly referred to as the *presynaptic neuron*, to either another neuron or some other type of somatic cell (e.g., muscle cells or vascular cells). The cell that receives the molecule is referred to as the *postsynaptic cell*. Neurotransmitters are released into a gap between cells, called the *synaptic cleft*, and bind with specialized proteins, called *receptors*, that are imbedded in the membrane of the postsynaptic cells. This interaction can have many effects on the postsynaptic cell depending on the type of neurotransmitter released, as well as the type of receptor with which it binds.

A main function of many neurotransmitters is to activate the postsynaptic cell. For example, when the neurotransmitter glutamate is released onto another neuron and binds with certain receptors, sodium ion influx is induced in the postsynaptic cell, resulting in a heightened propensity for that neuron to also release neurotransmitters onto additional neurons or somatic cells. When the neurotransmitter acetylcholine is released onto muscle cells, sodium ion influx results in a contraction of the cell; this is how movement is induced.

Some neurotransmitters function to inhibit the action of the postsynaptic cell. Gamma-aminobutyric acid (GABA), for example, is present in many specialized neurons called interneurons. GABA is released from interneurons to reduce the excitability of the postsynaptic neuron as a control mechanism to prevent overexcitation. This occurs by means of an influx of chloride ions. One of the effects of alcohol consumption is an inhibition of these interneurons, resulting in disinhibition. Behaviorally, this is expressed as uncontrolled movements (swaying, stumbling), slurring of speech, excessive speech, and acting in other ways that are normally inhibited when not intoxicated.

Another main function of many neurotransmitters is to induce intracellular changes in the postsynaptic neuron. For example, when glutamate binds with certain receptors (different from those previously mentioned), calcium ion influx is induced. This can lead to a variety of responses, including cellular restructuring, gene activation, and apoptosis (programmed cell death), among others. This interaction is also implicated in the cellular mechanism of learning and memory, called *long-term potentiation*.

Two main classifications of neurotransmitters exist based simply on molecular size: neuropeptides are relatively large transmitter molecules of 3 to 36 amino acids, whereas small-molecule neurotransmitters are smaller. There are more than 100 identified neuropeptides and more than a dozen identified small-molecule

neurotransmitters. Classification as a neurotransmitter is contingent on three criteria: (1) the presynaptic neuron must contain the molecule, (2) the presynaptic neuron must release the molecule in response to sufficient activation (depolarization) and subsequent calcium ion influx in the presynaptic terminal, and (3) the molecule must be able to bind to specific receptors on the postsynaptic cell.

Malfunctions in neurotransmitter production, secretion, and reception have been implicated in many disorders. For example, suboptimal levels of the neurotransmitter dopamine in an area of the brain called the *basal ganglia* (vital for control of bodily movements) results in Parkinson's disease. Also, drugs that enhance the activity of the neurotransmitter serotonin are an effective treatment against depression, implicating the role of this molecule in mood regulation.

Just as many prescribed medications are designed to interact with certain neurotransmitters, many illicit drugs also affect neurotransmitter systems, albeit detrimentally. Cocaine, for example, results in abnormally large amounts of dopamine release. Although the initial effect is an elated "high" because dopamine is the main neurotransmitter in the brain's "pleasure center" (the nucleus accumbens), cellular mechanisms are in place to counteract overactivity. These mechanisms reduce the number of receptors on the postsynaptic neuron that dopamine binds with, reducing the effectiveness of dopamine. As such, the individual then needs to ingest higher levels of cocaine to achieve the same effect; this is the cellular mechanism of addiction.

In summary, neurotransmitters are present in every neuron throughout the life span of an individual. Many different neurotransmitters must work together in complex systems to achieve the harmonious balance of normal functioning, and disruption of neurotransmitter systems can result in developmental abnormalities, including many identified disorders. Although much is known about many neurotransmitters and neurotransmitter receptors, much remains to be discovered. Neuroscientists working to unlock more of the mysteries of the nervous system hope to garner sufficient information, over time, to counteract or prevent disruption of neurotransmitter systems and the diminutive effects of such.

—David J. Bauer

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NEW YORK LONGITUDINAL STUDY (NYLS)

In the mid-1950s, theoretical views of child development minimized the differences between children, tending to lump them together as "the 1-year-old" or "the terrible 2s," and tended to hold parents, especially mothers, responsible when children developed emotional problems. For instance, schizophrenic children were thought to have been brought up by "schizophrenogenic mothers." In the ideological desire to stress environmental, rather than biological, factors in the development of pathology, the child's own characteristics were often minimized.

In 1956, two psychiatrists affiliated with New York University Medical Center, Stella Chess and her husband Alexander Thomas, formed the nucleus of a group of researchers and began the New York Longitudinal Study (NYLS), the goal of which was to deal with these issues and search for alternative ways to consider both normal and abnormal patterns of development. Their plan was to follow a group of children for about 30 years to assess the continuities in development that can only become evident when the same people are studied at different points in time. The primary sources of data were structured interviews with parents scheduled at 3-month intervals when the children were young and less frequently as the children became older. Although the study's premise was that parents could best describe how their child responded in a variety of situations, ranging from first exposure to a new situation to the repetitive aspects of daily life, some interviews were compared

with evaluations of children's behavior by trained observers. Additional information was obtained from pediatricians and teachers. Standardized intelligence tests were given when the children were 3 and 6, and data about the reliability of parental recall and parental attitudes were also gathered.

Between 1956 and 1962, 133 children from 80 families were evaluated. Over time, younger siblings of the original group were included to obtain information on different children in the same households. The sample was not representative, in that it was drawn from acquaintances of the study directors, many of whom were accomplished professionals, and emphasized the need for long-term participation. However, the special nature of the sample made it possible for 97% of the original group to remain in the study until the children were in their thirties—a proportion totally unmatchable in longitudinal studies that begin as representative populations. Subsequently, a sample of 95 children born to Puerto Rican working-class families in New York was added to verify the notion of temperament in a different sociocultural context. The NYLS has also been the stimulus for a number of studies in the United States and elsewhere.

To maximize objectivity of parental responses, interview guides were developed by the study staff that emphasized careful description of events, as contrasted with value judgments or opinions of behavior. Over time, the initial guides and rating scales were modified as the children became older and their behaviors became both more complex and more influenced by their social milieu.

To permit statistical analyses of the data, as well as comparison with other populations, a rating scheme was developed, whereby children's temperament could be assessed in terms of the following nine categories:

- Activity level, reflecting the daily proportion of active and inactive periods
- Rhythmicity, the regularity of such aspects as the sleep or hunger cycle
- Approach or withdrawal to new situations
- Adaptability, ability to modify behavior
- Threshold of responsiveness to sensory stimuli or social contacts
- Intensity of reaction
- Quality of mood—amount of pleasant behavior or crying, unfriendly responses
- Distractibility
- Attention span and persistence, or the length of time an activity is pursued, despite obstacles to continuation

Each of these categories was rated on a three-point scale as high, medium, or low, and weighted totals were computed for each interview. Three temperament constellations were identified:

1. **Easy**, typical of 40% of the sample, combined such traits as regularity, approach to new situations, quick adaptability, and positive mood
2. **Difficult**, involved irregularity, withdrawal, and frequent negativism at high intensity (10%)
3. **Slow-to-warm-up**, showed initial withdrawal to new stimuli and slow adaptation to change (15%)

It is this distinction of easy and difficult temperaments that is most often represented in the description of NYLS in introductory or child psychology texts. However, 35% of the children in the study could not be categorized because they showed mixed features or were inconsistent.

Several issues must be considered in assessing the contributions of NYLS:

1. Rating the basic temperamental categories in three steps—low, medium and high—was very useful in ensuring interrater reliability, but it does not permit distinguishing between high and extremely high activity or intensity. Demonstrating levels can be difficult for approach/withdrawal as a single category. Finally, some temperamental assessments may not be truly independent, notably distractibility and attention span/persistence or approach/withdrawal and quality of mood.

2. Gender differences in temperament were not considered, possibly because the size of the sample made this difficult. However, it is plausible that parents would be more tolerant of high activity and high intensity in boys, and withdrawal or low intensity in girls, influencing the delineation of some children as "easy" or "difficult" or increasing the number of "inconsistent" cases.

3. Demonstrating continuity of temperament becomes more difficult as children grow older. Behaviors become more complex, and older children learn to modify patterns as they become part of their daily routines. Although the activity level of a 3- or 6-month-old can be measured and compared, it is much harder to figure out how to deal with mental activity and with such widely different physical activities as playing football or the violin. With growth and changes in

expectations, infants with irregular sleep-wake cycles learn to appear at work or class on time, and children who withdraw from new foods may appear to be excellent eaters when they are able to control their choices as adolescents or adults.

4. The role of culture, social class, family size, peers, and such events as war or famine bring further complexities to development and make it harder to discern the role of temperament as people grow up. NYLS tried to factor in such aspects as the nature of the home environment and special circumstances, such as the birth of a sibling, parental death, or divorce, as well as children's handicaps and special talents, but the size and special nature of the sample make it difficult to generalize to broader populations.

Despite these concerns, the NYLS focus on temperament has been a boon to parents, teachers, and therapists and those who look for tools to help understand normal and pathological development.

1. It brought into focus, for both normal and abnormal development, the importance of the child's intrinsic traits. Having longitudinal data before the identification of behavior disturbances is a rare occurrence for clinicians. Unlike retrospective histories, which can be colored by knowledge of present difficulties, forgetfulness, and distorted memory, the data obtained anterospectively could be used to provide unbiased insights into prior antecedents of some behavior disorders.

2. The study also encouraged the recognition of "goodness of fit" between the child's temperament and parental practices. Parents learned to identify patterns and encourage practices likely to enhance the child's functioning and, in the process, enhance their own satisfaction. For instance, when parents of a "slow-to-warm-up" child could send the child to the same nursery school or day camp for several years in a row, they enabled the initially timid child, who held back from active participation, to have the opportunity to develop into someone who could feel comfortable in the situation or even be a star in a now-familiar environment.

3. The study made it possible to compare outcomes for children of similar temperaments. The data suggested the need for parental awareness and resilience and the benefits of flexibility, rather than imposing a single approach. This flexibility is equally important for others who interact with children, such as teachers and athletic coaches.

4. Temperament was offered to therapists, study participants, parents, and others who worked with children as another way of explaining emotional reactions and behavior and as a tool to initiate change and make decisions. The study staff, many of whom were experienced clinicians, recognized that temperament is only one of many aspects contributing to personality and behavioral disturbances, but one which could be very useful in determining the need and appropriateness of various types of professional intervention.

—Lillian Robbins and Edwin S. Robbins

See also Longitudinal Research

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NICHD CHILD CARE STUDY

The National Institutes for Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development is the most comprehensive study in the United States on the relationships between child care and children's development. This study is significant because most children in the United States younger than 5 are cared for by someone other than their mother.

To address questions surrounding the placement of children in nonmaternal care, NICHD initiated a large study of children beginning at birth and followed over time. This prospective, longitudinal study is a collaborative effort among NICHD staff and scientific investigators (NICHD Early Child Care Research Network). The investigation takes place in 10 locations around the country, representing a variety of geographical regions, ethnic groups, family structures, and income levels. In Phase I (1991–1994), children were followed from birth to age 3; in Phase II

(1995–1999), the same children were followed through first grade; and in Phase III (2000–2004), these children are being followed through sixth grade. More than 1,300 children were enrolled in the study at Phase I, and 1,100 remained enrolled at Phase III.

This study examines the relations between child care experiences and development while considering other contexts in children's lives, especially the family environment, as well as child characteristics (gender, temperament) and later school and care settings. Child outcomes under investigation include (1) social and emotional development (relationships, emotional adjustment, behavior problems), (2) cognitive development (intellectual functioning, language, knowledge and achievement, cognitive processes such as memory), and (3) physical development (growth, health). Data have been collected through questionnaires and interviews with parents and child care providers and teachers, observations of the children in the laboratory and their care settings, direct testing of the children, and examination of school records.

Results demonstrated widespread use of nonmaternal care, with early age of entry, long hours of care, and frequent changes in child care arrangements. The following components of child care were examined for their links to child development: (1) quality (e.g., small group sizes and child-to-staff ratios, caregiver training, caregiver sensitivity, number of professional standards met), (2) quantity (number of hours spent in care), (3) type (e.g., center-based, care by a relative, family day care home), and (4) stability (number of different arrangements).

Overall, results indicated that family influences were more strongly and consistently linked to child development than were early child care experiences. Nevertheless, child care quality, quantity, and type were associated with varying facets of child development.

Social-emotional development was positively affected by quality of care. High-quality care was associated with better social skills and fewer reported behavior problems at ages 2 and 3 and more compliance at age 3. However, more time spent in child care was associated with more reported behavior problems at 2 years, 4½ years, in kindergarten, and in first grade and with lower teacher-reported social skills in first grade. Children whose mothers were less sensitive and who spent more than 10 hours per week in child care were more likely to be insecurely attached to their mothers as toddlers. More experience in group care before age 1 was associated with more behavior problems at age 3; however, cumulative experience in group settings over time was associated with more cooperation and less negativity with mothers, as well as with fewer reported behavior problems at ages 2 and 3.

Cognitive development was also influenced by child care. Higher observed quality of caregiver behavior, especially language stimulation, was related to children's cognitive development, including language and school readiness, during the preschool years. There is evidence that the effect of high-quality child care on language development at age 4½ may indirectly lead to higher reading and math achievement in first grade. Greater cumulative experience in child care centers was associated with better cognitive performance at ages 3 and 4½, and earlier experience in child care homes was associated with better cognitive functioning at age 3. Quantity of care had little impact on cognitive development.

Children in group care had more ear infections, upper respiratory infections, and stomach illnesses during their first 2 years of life. Health conditions were associated with a greater number of children in the setting.

A new phase in this study will follow these children through middle school, providing information about possible lasting associations among child care experience, family environment, school settings, and child development.

—Amy L. Sussman

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NOBLE SAVAGE

The term *noble savage* was first used by John Dryden in 1672; however, it is most commonly used to refer to Jean-Jacques Rousseau's romantic depiction of basic human nature in *Discourse on the Arts and Sciences*. This work was Rousseau's winning entry in an essay contest sponsored by the Academy of Dijon, which asked, "Has the progress of the arts and sciences contributed more to the corruption or purification of morals?" Rousseau responded in the negative, writing that man is essentially good (a "noble savage") when in the state of nature, as it was before the creation of civilization.

Rousseau thought that in the natural state, children are innocent and good unless corrupted by society. Attributes of the noble savage often included human life existing in harmony with the natural world, independence and equality among people, ignorance of good and evil, physical health and strength, moral courage, an inability to lie, the absence of crime, and a lack of sexual inhibitions. However, material desire for comfort and health eventually led to humans interacting as social beings, making agreements with each other and at the same time limiting their own freedom. Although enlarged desires may have led to an improvement in the human condition, they also lead to interdependence and inequality. Rousseau saw society as artificial and corrupt; he argued that the progress of knowledge made governments more powerful and individual liberty weak. The accumulation of wealth erodes the possibility for true friendship, as people exhibit jealousy for material goods of others, fear of losing their own wealth, and suspicion of others' motives. That which furthers society results in the unhappiness of mankind.

These ideas relate to the social and historical context in which Rousseau lived and can also be understood in the transition from the calculating philosophies of the Enlightenment to the living and "natural" ideals of the Romantic period. European colonizers did not have high regard for the indigenous peoples that they encountered; they were mostly interested in extracting natural resources and human labor. The European held notions that these other people were "primitive" and "savage," being psychologically and socially inferior to themselves. These notions may have served to justify European colonial domination and exploitation. The concept of the noble savage may have served as a retort to these prejudicial beliefs. It is also related to the Romantic notion of primitivism, wherein people living in the wild were considered closer to God, living purer lives in the nature that reveals and glorifies God.

Rousseau carried the notion of the noble savage into the ideas expressed for natural education in *Émile*. He described the ideal training for a child to be in harmony with nature, wherein the natural beliefs in God and religion resulted from experiences and should be encouraged. Book learning was de-emphasized in favor of experiential learning in one's environment. Rousseau also recommended that a child's emotional development should be encouraged before his or her reasoning abilities. These views had a profound influence on educational methods at the time and continue their influence to this day.

Later in life, Rousseau reversed his opinions in *The Social Contract*, where he depicted the state of nature as brutish, amoral, and lawless. Natural man was a savage enslaved by impulse, and good people only existed in the presence of society. Rousseau now saw humans as being in competition with others in the natural state, and that they could become more successful competitors by forming alliances. By agreeing to the conditions set for societal membership ("The Social Contract"), people give up natural rights to preserve themselves and remain free.

—Daniel J. Kruger

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NOISE

Noise is a term that refers to unwanted, and usually unpleasant, sound. The intensity of sound is measured

in decibels (dB). High-intensity sound can damage hearing organs. Children's hearing is more susceptible to damage than is adult hearing, and damage to hearing organs cumulates over the life course such that early exposure to high-intensity sound may be revealed in later adulthood as a permanent hearing loss. Therefore, everyone should avoid exposure to high-intensity sound, especially children, and toys that create high-intensity sound should be avoided.

Prenatal exposure to high-intensity sound while working in close proximity to machines that create at least 85 dB is associated with hearing loss in children. Newborns who have been in an incubator or neonatal intensive care unit (NICU) are more likely to show a permanent hearing loss as children than are newborns who were not in the NICU. NICUs often expose the newborn to noise in excess of 80 dB that is continuous. Also, some medications given to ill neonates may be toxic to the hearing organs. The American Academy of Pediatrics called for quieter NICU equipment as well as change in activities of health care personnel to prevent noise: avoid tapping on the incubator cover or using the incubator cover as a writing desk, speak softly, and wear soft-soled shoes.

Beyond effects on the hearing organs, noise also has negative developmental effects on speech perception, reading, school performance, and stress. In 1973, research in New York City showed a dose-response relation between chronic exposure to high-intensity highway noise at home and worse scores on standardized reading tests in elementary school. This finding was replicated in the 1980s for aircraft noise even when children took the reading tests in a sound-insulated environment. In the 1990s, a longitudinal prospective study in Munich, Germany, showed that noise exposure is associated with lower reading scores. These results hold when children's socioeconomic status is statistically controlled and when children with a slight hearing loss are removed from the sample. The Health Council of The Netherlands and the United Kingdom Institute for Environment and Health both concluded that chronic exposure to high noise has deleterious effects on children's school performance.

Noise is thought to affect children's school performance and reading scores negatively because it can interfere with speech perception. Children living in high noise environments perform more poorly on tests of auditory word perception that require fine distinctions between similar phonemes (phonemes are the sound components of words). When children are learning to read alphabetic languages, the ability to connect phonemes to letter combinations is very important and requires accurate perception of the phonemes.

High-intensity noise, even for a short time, is also a powerful psychobiological stressor. Children living near airports have higher blood pressure and cortisol (a hormone produced in response to stress) than children living in quieter neighborhoods. In adults, ischemic heart disease and hypertension are associated with residence in high noise environments. Annoyance, disturbed sleep, and poor mood due to sleep disturbance are other effects of noisy environments.

Both animal and human research has shown that prenatal stress is associated with negative neurodevelopmental outcomes such as low birth weight and shorter gestation. Daily exposure to a brief loud noise in pregnant rhesus monkeys has negative effects on offspring, including impaired neonatal visual orienting and motor maturity and altered levels of the neurotransmitter dopamine in the striatum, an area of the brain that is important in behavioral regulation.

—Colleen F. Moore

See also Sensory Development

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NORM-REFERENCED TESTS

Although many people do not recognize the term *norm-referenced testing*, almost all have encountered it at some point in their life. Since the 1800s, it has become the most widely used approach for measuring individual differences. School children routinely take

norm-referenced tests of achievement during their elementary and secondary school years. High school students complete norm-referenced aptitude tests as part of the college application process. Even adults take norm-referenced tests to show competence to practice a profession.

The primary purpose of norm-referenced testing is to compare a person's performance with that of others in a "norm group." Typically, this norm group is a large group of individuals for whom decision makers want to make meaningful comparisons. National norm groups are the most commonly used samples, but norms can easily be constructed for school districts, different socioeconomic groups, and separate ethnic and racial groups.

In norm-referenced testing, individuals are evaluated by their standing relative to the norm group. Scores reflect a person's performance in relationship to this specified group and are typically reported as percentiles, stanines, grade equivalents, or standard scores. For example, a student might score at the 65th percentile on a statewide achievement test, meaning that the student performed better than 65% of students in the state.

Although achievement and intelligence tests constitute the oldest and most commonly used types of norm-referenced tests, several others have emerged since the 1910s. Personality tests, designed to measure social and personal adjustment areas, have found increasing popularity among educators and psychologists. Attitudinal scales and interest inventories have also come into wide use by those in such fields as career and school counseling.

The popularity of norm-referenced tests stems in large part from the usefulness of these tests in helping decision makers form judgments about individuals. The tests have been widely used for selection purposes, for example, when it is necessary to limit the number of people who could be admitted to a program or hired for a job. The tests have also been used for placement purposes, such as the placement of a student into a particular math class. Many norm-referenced tests have also been used for screening or diagnosis to make decisions about whether a person needs special educational or psychological services. Increasingly, scores from norm-referenced tests are serving as feedback to parents and children on the progress of their children toward important developmental and educational goals.

In the world of testing, norm-referenced tests represent the major, but not the only, approach to the measurement of achievement. Since the 1960s, criterion-referenced tests have become norm-referenced tests' major competitor. Although the two tests serve the same purpose of measuring student learning, they differ in fundamental ways. One difference is in the kind of information they provide. Norm-referenced tests measure a student's level of achievement compared with other students, whereas criterion-referenced tests indicate how proficient a student is in terms of a specific body of learning. Because of this focus on specific tasks, criterion-referenced tests tend to be more focused in nature, whereas norm-referenced tests tend to be more general, covering a broad array of learning tasks. The development of the items also differs markedly. Criterion-referenced tests are often developed by teachers using carefully selected items to match the objectives. Norm-referenced tests are usually developed by test experts with items chosen for both their content representativeness and their ability to differentiate among students.

Critics generally agree that norm-referenced tests are most useful for measuring a person's general level of knowledge or understanding of a subject. Tasks that are complex or require higher levels of cognitive domain also seem better suited for norm-referenced testing. Given that many tasks fall into one of these categories, norm-referenced testing seems here to stay. The trend certainly suggests that norm-referenced testing will remain the dominant form of assessment for years to come.

—Karin Chang-Rios

See also Norms

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NORMAL CURVE (BELL CURVE)

The normal curve, also known as the *bell curve* or *gaussian curve*, illustrates the distribution of scores within any given sample of a population. Three properties characterize this bell-shaped distribution. First, the normal curve is symmetrical around the mean. If the curve were divided along the center line, both halves of the curve would be identical. Second, the tails, or extreme edges, of the normal curve approach the horizontal axis as scores become more and more extreme, although they never actually touch the axis. These tails are considered to be asymptotic. Finally, the mean, median, and mode of the distribution are all equivalent. These values must be equal to each other to produce the shape of the curve. If one of these three values were different from the others, the distribution would be skewed, or slanted, to either side of the mean.

When repeated samples of data are taken from a population, with data sets larger than 30, the curve values resemble the normal curve. Even if the population is not normally distributed on some characteristic, the means of randomly selected samples chosen from this population will be distributed normally. This normally distributed curve occurs frequently in the environment and allows people to make inferences about characteristics from a sample to the general population. This ability to infer is invaluable because of the impracticality of collecting data from the entire population when interested in measuring a characteristic. Many disciplines use this inferential technique to collect information about a group of interest.

According to this normal curve, when sampling a population for any characteristic, most of the values will fall close to the mean, or near the central hump, in the distribution. As the value becomes more and more extreme, or distant from this middle point, the likelihood of this extreme value decreases. By knowing the mean and standard deviation of this curve, the probability of any given value can be calculated, as well as how many cases lie between two points on this normal distribution. Almost 70% of the scores along this distribution will fall within the normal range, or between 1 standard deviation above and below the mean.

Many phenomena, developmental or otherwise, are generally distributed along the normal curve. Intelligence quotient (IQ) is one construct that regularly uses this principle. Most of the population falls near the center of the curve when IQ scores are plotted. That is, about 70% of the population falls within 1 standard deviation above or below the mean, or is considered to have average intelligence. Few individuals fall at either extreme of this curve, whether that is at the very high or very low levels. These numbers become even smaller as these IQ values become more extreme.

—Kimberly A. DeRuyck

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NORMS

Norms are rules of conduct that specify appropriate behaviors in particular social contexts based on general values. "Norm" is derived from the Latin, *norma*, a carpenter's level. More generally, a norm is a model of what should exist or be followed, or an average of what currently does exists. Norms are a key aspect of culture; they organize and regulate our behavioral and social worlds. A norm can proscribe behaviors that are expected to occur, indicate behaviors that are permitted, and designate behaviors that are forbidden. Norms can be specific to a certain role, or they can specify the timing and sequencing of behaviors in a particular process.

Norms are learned from the social groups in which one is socialized. All human groups have norms, which are backed by sanctions varying from disapproval to death. Some researchers distinguish among three different degrees of norms. *Folkways* are fairly weak norms that do not provoke much concern if they are violated. *Mores* are stronger than folkways, and violation of mores will result in much stronger pressure to conform behaviorally. *Laws*, or *legal norms*, are very strong, explicit codes that entail specific legal consequences when they are violated.

Conformity to norms is also substantially driven by internal motivations. Violation of norms may result in shame; violation of minor social conventions may lead to embarrassment. Norm-consistent behavior

may lead to the experience of pride. By conforming to social standards, one may indicate reliability and allegiance to a group, increasing the chance that one will be chosen as a social partner.

One example is the norm of reciprocity, whereby actions benefiting other individuals can be expected to be returned in kind. When this norm is violated, people become upset and may retaliate against those who do not reciprocate. Norms may differ from culture to culture. This is readily apparent when considering the variation in what is considered acceptable public attire or physical distance during conversation across diverse cultures. Cultural differences have also been documented in the perception of when one should arrive for an event when one is given a designated starting time.

Fishbein and Ajzen's theory of reasoned action and Ajzen's theory of planned behavior incorporate norms into models of decision making. The behaviors one perceives to be favored or expected by important referent individuals or groups are referred to as *normative beliefs*. The motivation to comply with each referent individual or group regarding specific behaviors, or the "subjective norm," combines with normative beliefs to influence an individual's intention for performing the behavior. In the theory of planned behavior, behavioral beliefs, attitudes toward the behavior, and perceived behavioral control also influence behavioral intentions. Numerous studies have supported the validity of this model, for example, demonstrating that social norms are significant predictors of college students' alcohol consumption.

Although many norms, such as following traffic signals, are beneficial, not all norms have been considered helpful. Normative gender roles in both Western and non-Western societies have been decried as harmful and even oppressive to women. Norms can become problematic if they are based on arbitrary or adverse conventions. For example, the normative behavior of elementary school classrooms, where children are expected to sit still and silent for considerable lengths of time, is inconsistent with the childhood environment throughout the vast majority of human history. In some cases, there may not be a clear or valid basis for what is considered normal and what is considered aberrant. Behaviors considered deviant in one culture or subculture may actually be the norm in another.

—Daniel J. Kruger

See also Norm-Referenced Tests

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NURSERY (PRESCHOOL)

The terms *nursery* and *preschool* are used interchangeably to refer to part-time, center-based programs with a focus on education or socialization of young children. For convenience and conciseness, this article uses only the term *nursery* to refer to programs of this type. It does not discuss nursery programs that are full-time because these are more often called *child care* or *day care* and are discussed elsewhere in this volume.

By providing extended access to peers and to planned experiences at an impressionable time of life, nursery programs can potentially influence children's overall development, hopefully in good ways. This article summarizes research about this possibility. It begins, however, by describing the nature and extent of nursery programs, followed by briefly explaining their historical origins, and then by describing current issues in nursery programming.

NATURE AND EXTENT OF NURSERY AND PRESCHOOL

Characteristics of Nursery and Preschool

Like children attending full-time child care, children served by nursery programs are usually 3- and 4-year-olds. In a nursery program, however, a child usually attends only 2 to 4 hours per day, for 3 to 5 half-days per week, and for 8 to 10 months per year. Depending on the program, a child typically

encounters a mixture of "curriculum" and social experience. The former tends to focus on oral language development and preliteracy skills, goals that are often justified as preparation for elementary school. The social experience of nursery school tends to consist of a mixture of group games (e.g., "Simon Says") and freely chosen play organized individually or in small groups. The social experiences are often justified as fostering self-confidence and social skills. As noted below, however, the proper balance of education and socialization is a continuing issue for educators, developmental psychologists, and parents.

Extent and Distribution of Nursery and Preschool Programs

In the 1980s in the United States, about 30% of 3- and 4-year-olds attended some sort of part-time nursery or preschool program, and by the end of the century, the proportion had risen to about 50% across the nation as a whole. The proportion has risen faster than average among African American families (to about 60%) and slower among Hispanic families (currently holding at about 35%). Around the world, rates of nursery attendance correlate strongly with median family income and educational level, with rates varying from virtually 100% in France, Sweden, and Japan to virtually 0% in India and most of Africa. Among the economically developed nations, therefore, the United States ranks relatively low in nursery school attendance. Its programs are also more diverse than other developed nations and are less well funded and coordinated by national authorities and policies. These facts probably contribute to the ongoing concerns and debates in the United States about the quality and impact of nursery and preschool on children's development.

ORIGINS OF MODERN NURSERY AND PRESCHOOL PROGRAMS

Nursery education has philosophical roots in 17th- and 18th-century European thinkers such as Comenius and Rousseau, who in various ways emphasized the goodness of young children and their inherent capacity to learn. The first actual programs in North America drew heavily from the pedagogical recommendations of Freiderich Froebel, a German educator who published detailed curricula prescribing specific goals and activities for young children and specific ways for adults to teach them. As the number of Froebelian programs increased, they soon diversified in character, with some becoming more child centered or "developmentally appropriate" than others. Their clientele also diversified, with some programs deliberately serving children of the poor, like the full-time child care centers that emerged in the 20th century. Other nurseries served primarily well-off middle-class children. Debates were soon underway, therefore, about how child centered nursery education should be and about who should be properly served. As noted below, these issues continue to this day.

Nursery programs became gradually, if erratically, more widespread in North America beginning in the 1920s, along with the growth of full-time child care centers and popularization of kindergarten in public schools. Compared with child care centers and kindergartens, nurseries were more often funded by an eclectic combination of government initiatives and private funding, but with comparatively more of the latter. Many programs began as teacher training institutes or as university-based "lab schools" for programs of child studies. These often focused more on charting, explaining, and supporting children's development than on teaching school-like skills. The emphasis and sponsorship differentiated them both from school-based kindergartens, which operated in a more curriculum-focused context, and from full-time centers, which existed to serve parents' needs for child care as well as to serve children's needs. The part-time, privately funded status common among nurseries, furthermore, tended to position them to serve middle-class families, especially those in which one parent (usually a mother) was not employed outside the home.

By the middle part of the 20th century, "nursery school" tended to connote an enrichment experience for children of families whose circumstances allowed such participation. The connotation contained a grain of truth, but was not (and still is not) entirely accurate. In the 1960s, for example, the American federal government launched Project Head Start as part of its "war on poverty" in the United States. The project provided nursery-like programs for thousands of pre-kindergarten children and their families. Unlike most traditional nursery programs, however, Head Start drew its clientele primarily from low-income communities. It also aimed, among other goals, to teach pre-academic skills (especially language arts) that would prepare children for school and protect them from school failure.

ONGOING ISSUES ABOUT NURSERY AND PRESCHOOL EDUCATION

Since its beginning, the nature and purpose of nursery education have been debated vigorously. Much of the discussion relates to the general issue of to what degree programs should be child centered compared with instructional or curriculum centered. Advocates of child-centered programming favor ample time for play and self-chosen activities. They also tend to emphasize the social development of children—learning to cooperate with others, to feel self-confident, and the like. Fostering these qualities, they argue, helps to ensure academic success later when children enter elementary school. Advocates of instructional or curriculum-centered views are less concerned about general development and give more priority to learning the skills that children need for kindergarten and elementary school. They sometimes argue that academic preparedness develops children's confidence as a by-product and therefore also develops children's social skills. The debate is useful in clarifying the choices and dilemmas faced by practicing nursery teachers, but it is also artificial in the sense that most teachers make reasonable efforts to attend to a variety of developmental needs—social, cognitive, and physical.

Sometimes the child-versus-curriculum issue is framed simply as the question of whether nursery programs should provide experiences that are truly intentional and planned, or that are simply safe and responsive to children's initiatives. When framed in this way, part-time nursery programs have tended to position themselves as more "intentional" than full-time programs. By being part-time, it is argued, teachers can devise more focused, thoughtful enrichment for children—whether the enrichment has an instructional or a child-centered character. Others argue, however, that the distinction between part-time and full-time programming is not at all clear-cut; it is possible both to be "merely custodial" in a part-time program and to be "intentionally educational" in a full-time program. The distinction may contribute, furthermore, to unfortunate stereotypes of full-time child care as an inherently inferior service, socially or developmentally.

Underlying this debate is an ethical issue of social policy: How much should nursery and preschool programs serve families with low incomes, compared with serving families with middle or high incomes? Because families with lower incomes are statistically more likely to be headed by a single parent, they are more likely to need child care that is full-time, as well as to need financial assistance to pay for it. Because governments (at all levels) and community agencies end up providing some of the assistance, nursery education and child care become a public (i.e., political) issue. In the United States, the debate has been more protracted than elsewhere, perhaps because of its large economic and cultural diversity and because of its philosophical traditions of individual self-reliance.

EFFECTS OF NURSERY AND PRESCHOOL

Several large and carefully designed evaluations of early childhood programs, including nursery programs, have converged on several conclusions about the effects of organized programs for young children. The conclusions can be summarized as follows:

1. Well-implemented programs tend to benefit children from low-income or "at-risk" families more than they benefit children from middle-income families.

2. The specific curriculum or approach used by a program makes little difference in the outcomes of the program, as long as the program is planned and implemented thoughtfully.

3. During a program or for about 1 year thereafter, well-implemented programs produce significant gains in children's tested intelligence quotient, school achievement, and social adjustment as rated by their teachers.

4. In the long term (as much as 20 years following the program), children from well-implemented programs continue showing gains in school achievement, are significantly less likely to need special education, and are less likely to engage in antisocial activities (e.g., juvenile delinquency).

5. The markers of quality and success of a program vary with the cultural context. For example, high quality in the United States is marked by higher levels of staff training and smaller class size. High quality in Japan, France, and Italy, however, is unrelated to levels of staff training, and quality programs routinely have class sizes that would be considered unprofessional in the United States or even illegal.

—Kelvin L. Seifert

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NUTRITION

Eating is a natural event and is typically a pleasing experience. However, eating well or maintaining good nutrition is a complex and difficult undertaking. The U.S. Department of Agriculture, Center for Nutrition and Policy Promotion has established guidelines that define good nutrition for children, adolescents, and adults. These guidelines address the number of servings according to food groups that are recommended for daily consumption.

RECOMMENDED INTAKE

Children, ages 2 to 6 years, should consume about 1,600 calories per day (18 grams or less of saturated fat, 53 grams of total fat) through eating 6 servings of grains, 3 servings of vegetables, 2 servings of fruit, 2 servings of milk, and 2 servings (5 ounces) of meats or beans. Older children and adolescent girls should consume 2,200 calories per day (24 grams or less of saturated fat, 73 grams of total fat) through eating 9 servings of grains, 4 servings of vegetables, 3 servings of fruit, 3 servings of milk, and 2 servings (6 ounces) of meats or beans. Adolescent boys should consume 2,800 calories per day (31 grams or less of saturated fat, 93 grams of total fat) through eating 11 servings of grains, 5 servings of vegetables, 4 servings of fruit, 3 servings of milk, and 3 servings (7 ounces) of meats or beans.

For infants, the American Academy of Pediatrics recommends breast-feeding for the first 12 months, with supplemental foods beginning at about 6 months. During the first 4 to 6 months, breast milk or an iron-fortified infant formula meets the total nutritional needs of the infant (about 5–6 ounces every 3–4 hours at 2 months of age). Infants should first be introduced to cereal (e.g., iron-fortified cereal, 3–4 tablespoons, 1–2 times per day) as a supplement to the milk (5–6 ounces, 4–6 times per day). After cereal, strained, mashed or commercially prepared baby foods should be introduced (4–5 tablespoons, 1–2 times per day). Vegetables should be introduced first, followed by fruits (4–5 tablespoons, 1–2 times per day) and fruit juices (4–6 ounces per day). Meat and other protein foods (e.g., peanut butter, cheese) should be added at about 8–9 months of age (3–4 tablespoons each day). At 1 year of age, the infants should be eating the same foods as other members of the family and on a similar schedule (three meals and two snacks per day). Whole cow's milk can be used at 1 year, but lower-fat milk should not be provided until the child is 2 to 3 years old. Fat should not be restricted until the child is at least 2 years of age. Dairy products should be limited to about 16 to 24 ounces per day and juice to 4 to 6 ounces per day.

Preschool-age children require about 500 to 800 mg of calcium each day; school-age children about 800 mg, and adolescents about 1,200 to 1,500 mg. This is most often met through milk consumption, except in children with milk allergies. Younger children require about 10 mg of iron each day; older children and adolescents should have 12 (males) to 15 (females) mg of iron. Children with a poor diet or medical problems (e.g., liver disease) may need to take a daily multivitamin.

PROMOTING GOOD NUTRITION

Good nutrition is critical, particularly for children and adolescents, to prevent health-related problems (e.g., type 2 diabetes, iron-deficiency anemia, high blood pressure, asthma) and to promote cognitive growth. For about two decades, public policy health officials have attempted to coordinate efforts to

promote health at national, state, and local levels. In 1979, the Surgeon General of the United States established Healthy People, a national health promotion and disease prevention program. The goals and objectives of this program have been revisited three times. The newest inception was launched on January 25, 2000, as Healthy People 2010. One of the objectives addresses educational efforts to promote proper nutrition. The goal is for 95% of middle, junior high, and high schools to offer nutritional education. The programs are aimed at teaching and promoting the nutrition as defined by the food pyramid and recommended daily intake of calcium and iron. Although this goal is well intended, it may not lead to improved nutritional behaviors for children and adolescents. Most educational efforts have been found to increase knowledge successfully. However, knowledge does not necessarily translate into healthier behaviors, and many believe that nutrition education has little enduring consequences for desirable dietary behaviors.

A wide range of government supported programs for infants, children, and adolescents addresses nutritional needs. These include the Food Stamp program for low-income families; the Women, Infant, and Children (WIC) program for low-income pregnant women, new mothers, infants, and young children; the School Breakfast Program, the National School Lunch Program, and the Summer Food Service Program for needy school-age children; the Child and Adult Care Food Program (CACFP) for child care centers and Head Start programs; and the Emergency Food Assistance Program for low-income families. About 15% of the more than 8 million women served by WIC are adolescents, and three fourths of the participants are younger than 5 years. On an average day, more than 8 million children receive breakfast and almost 28 million receive lunch, either free or at a substantially reduced price. Slightly less than 2 million children are served by the Summer Food Service Program; about 2 million children in Head Start programs, child care centers, family child care, and after-school programs are served by CACFP. About 23 million persons participate in the Food Stamp program.

NUTRITIONAL HEALTH OF U.S. CHILDREN

Even though many programs exist to promote and support dietary health, the nutritional status of many children and adolescents is compromised. Many, if not most, children and adolescents are not making good food choices; they are consuming too much fat, too much saturated fat, and not enough fruits and vegetables. In fact, research suggests that only 2% of children meet the recommendations of the Food Guide Pyramid. Further, an alarming trend of rising rates of childhood obesity has been noted. Information from the National Center for Health Statistics indicates that 22.3% of boys, ages 6 to 11 years, were overweight in 1994; up from 15.2% in 1963. In 1994, 22.7% of girls were classified as overweight.

ROLE OF PARENTS

Promoting good feeding skills and healthy eating habits in children requires important parental attention. Caregivers must attend to the motor, emotional, and social maturation of the child. It is critical that infants are introduced to solid foods by 7 to 10 months of age to reduce the risk for developing chewing or texture problems. As compared with infants, toddlers show a preference for greater texture complexity; however, early positive experiences with difficult-to-chew foods may facilitate such acceptance. The toddler period, in particular, represents a high-risk time for developing feeding problems that can lead to poor nutritional status. Although infants show a fairly consistent appetite, toddlers' appetites vary tremendously from day to day. This appetite variability is accompanied by social-emotional changes associated with a quest for autonomy and requirements to adapt to adult limit setting. The caregiver's response to the changes in eating patterns and social-emotional maturation can affect eating behaviors, such that serious feeding problems can develop (e.g., limited texture, limited variety of foods, underconsumption). Behavioral interventions (i.e., contingency management) have strong empirical support for use in treating children with such feeding problems. It is important that caregivers encourage intake of a variety of foods because food preferences have been shown to predict later eating habits. Recommended foods for emphasis are dark, green, leafy, and deep-yellow vegetables and fruits.

Parents further influence the nutritional status of their children and adolescents through food selections, home eating patterns, meal structure, and modeling eating habits. Parents who eat fruits and vegetables are more likely to have children who eat fruit and vegetables. Frequent family meals with parents present are associated with adolescent consumption of fruits, vegetables, grains, and calcium-rich foods.

Early attention to establishing healthy eating habits may help promote good lifelong nutritional behaviors. However, it is important to carefully examine what children learn about nutrition. Some children use simplistic and inaccurate cognitive heuristics to make nutritional judgments. That is, they tend to believe that foods are either good or bad or that foods harmful in large amounts (e.g., fats) should also be avoided even in small amounts. These judgments may lead to dietary restrictions and nutritional insufficiencies. The consequences of such behaviors may be as severe as overconsumption.

SUMMARY

Good nutrition is vital for promoting health and preventing diseases. Encouraging good nutritional habits requires a coordinated effort from parents, schools, and public health officials.

—L. Kaye Rasnake

See also Eating Disorders, Obesity

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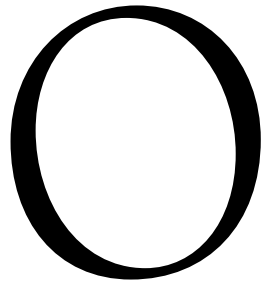

Old Age

The heads of strong old age are beautiful beyond all grace of youth.

—Robinson Jeffers

OBESITY

According to the Centers for Disease Control and Prevention (CDC), obesity is defined by a body mass index (BMI) of greater than or equal to 30, where BMI equals the ratio of body weight in kilograms to the square of body height in meters (BMI = kg/m^2). Among adults, having a BMI of greater than 30 is associated with significantly increased risk for a number of negative health consequences, including hypertension and other cardiovascular disease, type II diabetes, osteoarthritis, and various forms of cancer.

Among children, the measurement of obesity is also typically expressed in terms of BMI, although an expert committee convened by the Maternal and Child Health Bureau (MCHB), the Health Resources and Services Administration (HRSA), and the Department of Health and Human Resources (DHHS) recommends the use of *BMI percentiles*, rather than raw BMI values when determining a child's obesity status. As reported by this expert panel, children with BMI percentiles above the 95th percentile (i.e., children whose BMI is greater than 95% of their same-sex age-mates) are at greater risk for their obesity persisting into adulthood and are at a greatly increased risk for numerous health consequences.

SCOPE OF THE PROBLEM

Current estimates of the prevalence of obesity among adults in the United States range from 15% to more than 25%, depending on geographic location and population demographics. When adults who are overweight but not obese (i.e., a BMI between 25 and 29.9) are included in these statistics, as many as 61% of Americans are reported to have a weight problem that may have negative consequences for their physical and mental health.

According to these same reports, obesity currently affects more than 15% of youth between 6 and 19 years old in the United States. This represents an incremental change of more than 36% above 1994 estimates. Further, the prevalence of *extreme* obesity (i.e., a BMI greater than 40) has almost doubled among children between the ages of 6 and 11 since 1993.

MULTIPLE CAUSES OF PEDIATRIC OBESITY

Although the overall obesity rate among children has increased, a number of recent investigations have indicated that not all children are at equal risk for developing obesity. Specifically, children from low-income families, ethnic minority backgrounds, and

families with overweight parents are at increased risk for the development of obesity during childhood. However, some evidence suggests that the single greatest risk factor for obesity in childhood is a family history of a weight problem.

Although some percentage of the development of obesity is accounted for by genetic factors, Whitaker and colleagues (1997) have argued that a combination of genetic and environmental factors within families, such as a high calorie diet and low activity level, place children at the greatest risk. Because parents are typically "responsible" for their children's genetic makeup as well as their immediate environment (e.g., food choices, exercise opportunities), the link between parental obesity and child obesity may be *overdetermined*. That is, the two "sources" of risk for obesity are related to each other. For example, a child with obese parents may be at some risk for obesity because of the parents' genetic makeup, but the parents' lifestyle choices (e.g., higher proportions of high calorie or high fat foods, or limited exposure to lifestyle exercise) may increase the child's risk for obesity beyond what could be accounted for by genetics.

CONSEQUENCES OF PEDIATRIC OBESITY

Numerous investigations have identified specific physical health consequences that can be linked to pediatric obesity, including type II diabetes, sleep apnea, arthritis, gallstones, and some types of cancer. Further, studies have shown that up to 90% of obese adolescents have both hypertension (high blood pressure) and high cholesterol. Other researchers have suggested that excess body weight may alter the immune system, making infection and disease more likely in obese children and adolescents than in their nonobese peers. For those children whose obesity persists into adulthood, these serious medical consequences contribute to higher mortality rates. Studies among adults suggest that premature mortality rates increase 30% for those with a BMI greater than or equal to 30 and 100% for those with a BMI of 40 or higher.

In addition to physical health-related consequences, there are a number of psychological costs associated with pediatric obesity. Numerous recent investigations have suggested that children with obesity are at increased risk for negative self-concept; higher rates of depression, anxiety, and binge eating; lower popularity; and a negative self-image that affects decision making and interactions with peers. More recently, in 2003, Schwimmer, Burwinkle, and Varni reported that the general quality of life among children with obesity was significantly lower than that of healthy children and was similar to the health-related quality of life of children with cancer. The risk for mental health problems remains high if obesity persists into adulthood.

TREATMENT OPTIONS

Fortunately, a number of evidence-based treatment options are available for children and families coping with obesity. In a recent review, Jelalian and Saelens (1999) identified a number of components of weight management programs for children and adolescents that have produced positive short- and long-term results. These have including nutrition education, exercise programs, and behavior management. Each of these components will be briefly discussed.

Nutrition education for children and their families is one component of empirically supported treatments for obesity that appears to be essential for positive outcomes and has received significant attention in the research literature. Epstein and colleagues have produced a wealth of research on intervention programs that include a nutrition education component known as the "traffic light diet" (TLD; e.g., Epstein et al., 1998), as well as more general nutrition education. Numerous investigations have suggested that the use of the TLD in a comprehensive treatment program is associated with decreases in BMI, improvements in general nutrition, and decreases in children's self-reported preference for high fat and or high sugar foods.

In addition to nutrition education programs, *physical activity* programs of various structures have been found to be effective in the treatment of pediatric obesity, including both exercise alone and exercise programs combined with a nutritional component. Further, programs that promote a more physically active lifestyle (e.g., stairs rather than elevators) seem to produce better results than programs that promote the use of calisthenics alone.

Empirically supported therapies for obesity have also typically included the use of *behavior modification techniques* such as self-monitoring, praise, stimulus control, and modeling to improve weight loss. There is an abundance of literature that supports the efficacy of these techniques for improving eating and exercise habits of overweight children. In fact, some researchers have commented that the use of behavioral modification techniques is "critical" to the long-term success of obesity treatment.

OUTCOME STUDIES

As suggested by the above information, several components of treatments for obesity have shown success in clinical studies. Amounts of weight reductions have varied across these studies, ranging from about 10% to 25% over ideal body weight (i.e., reductions from 100% over ideal body weight to 90% to 75% over ideal body weight). Many of these reductions in body weight have been maintained over significant lengths of time.

However, in the most recent comprehensive review of empirically supported treatments for pediatric obesity, Epstein and colleagues (1998) noted that the treatment of children with obesity may hold more promise than the corresponding literature on adult obesity. They suggested that perhaps because of the greater possibility of lean muscle growth, the relatively fewer fat cells, and the increased web of social support (i.e., parents), children's outcomes appear more favorable than those of adults. The potential for changing unhealthy eating and exercise habits early in life also increases the odds of greater long-term success.

—Ric G. Steele

See also Eating Disorders, Nutrition

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OBJECT PERMANENCE

Object permanence refers to the understanding that objects continue to exist in their absence; that is, objects continue to exist as if "they are permanent" even though they may be out of sight. Jean Piaget discussed this concept within his stage theory of cognitive development, which contains four stages: sensorimotor thinking (0–2 years of age); preoperational thinking (2–7 years of age); concrete operational thinking (7–11 years of age); and formal operational thinking (11 years and older). For example, Piaget described the limitations of infants younger than 8 months of age (in substages 1–3 of the sensorimotor period), which included their lack of ability to think about objects in their absence. For these individuals, out-of-sight is essentially out-of-mind. At about 8 months of age, infants begin to demonstrate an understanding of the continued existence of objects in their absence.

The Piagetian task that is traditionally used to illustrate object permanence is the hidden object task, in which a baby is shown an interesting toy, which is then hidden behind someone's hand or under a blanket. I recall that I used to do this with my son when he started playing with the remote control for the TV. When he was young enough (roughly 6 months or younger), I could take the remote right out of his hands and hide it behind my back and without skipping a beat, he'd move on to something else, never even protesting, looking for, or attempting to retrieve the remote. This kind of behavior suggested his lack of object permanence at the time. Then one day I tried the old trick of hiding the remote and not only did he cry, but he grabbed at my arm that was behind my back and craned around me to look for, reach for, and find the remote. He had achieved some basic understanding of object permanence. Now I had to use another trick, which was to hide the object first behind my back, and then (even while he watched) I would put it under a pillow a few feet away from me on the couch. He'd invariably "fight" me to look behind my back, but would fail to look in the second hiding place, under the pillow where he'd clearly seen me hide it. This is referred to as the A, not B, search error, a tendency of 8- to 12-month-olds to repeatedly look in the hiding place where they last found an object (A) rather than in its more recent hiding place (B). This kind of search error led Piaget to argue that infants of this age (and in substage 4 of the sensorimotor period) have not yet fully mastered the concept of the object as enduring when hidden from view.

In the fifth sensorimotor substage, 12- to 18-month-old infants no longer make the A, not B, error, but they continue to have difficulty with hidden object tasks if they are not allowed to see the object displaced, from one hiding place to another. I could demonstrate this with my daughter until she was about 14 months old.

One day I took a superball from her and hid it in my hand, then I put my hand under a cushion and left the ball hidden there. As I removed my hand from under the cushion, she kept her eyes on my hand and tugged at my fingers even after I had shown her that I no longer had the ball. By 18 to 24 months (substage 6), infants will correctly search for the invisibly displaced object. It is at this point that Piaget included true mastery of object permanence and the ability to create mental representations among the capabilities of infants.

More recent research on the sensorimotor abilities of infants would suggest that some basic understanding of object permanence seems to exist at an even younger age than Piaget first suspected. For example, Baillargeon and DeVos, in 1991, used screens to occlude objects or parts of objects and employed the violation-of-expectation method. They then analyzed infants' looking behaviors (instead of reaching behaviors) and found that even infants as young as 3½ months of age looked longer at the impossible (unexpected) events. In another study by Goubet and Clifton in 1998, when researchers simplified the hidden object task (which originally required that the infant reach for the occluding object, push it aside, and retrieve the hidden object), and simply required the infant to reach for an object that was hidden in the dark and signaled by the noise it makes, 6½ month olds accurately retrieved the object. Researchers generally agree that looking and reaching should be differentiated and that looking comes developmentally earlier than reaching. Additionally, reaching behaviors are likely to indicate a more sophisticated understanding of object permanence than do looking behaviors overall.

Finally, performance on object permanence tasks has been related to intelligence, and hidden object tasks have even been added to recent editions of tests of infant intelligence, such as the Bayley Scales of Infant Development (Bayley, 1993).

—Lora Schlewitt-Haynes

See also Cognitive Development

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OBSERVATIONAL LEARNING

All humans and many animals imitate the behaviors of others in their own species. For instance, a young boy watches his dad shave and then mimics shaving motions on his own face. Also, a young girl often plays dress up by wearing her mom's high-heeled shoes, necklaces, and makeup. By watching their parents, children learn how to perform these and many other behaviors. Unfortunately, these behaviors include negative as well as positive ones.

Japanese macaques have been observed imitating others in the troop. However, the status of the individual being observed affects the extent of the mimicking that others attempt. For example, if the dominant male is observed exhibiting a behavior, all of the other troop members quickly imitate the male. In contrast, dominant males rarely, if ever, imitate the behaviors of females. Likewise, the troop members may not attempt to imitate the female's behaviors.

Bandura termed these types of behaviors observational learning. It is also known as vicarious learning, modeling, or imitate. Observational learning is a major component of Bandura's Social Learning Theory.

OBSERVATIONAL LEARNING

Observational learning consists of observing and modeling another individual's behavior, attitudes, or emotional expressions. Although it is commonly believed that the observer will copy the model, Bandura stressed that individuals may simply learn from the behavior rather than imitate it. He also emphasized that four conditions were necessary in any form of observing and modeling behavior: attention, retention, ability, and motivation.

Attention

If an organism is going to learn anything from a model, he or she must be paying attention to it and the behavior it exhibits. Many conditions can affect the observer's attention. For instance, if the observer is sleepy, ill, or distracted, he or she will be less likely to learn the modeled behavior and imitate it at a later date. In addition, the characteristics of the model have an influence on the observer's attention. Bandura and others have shown that humans pay more attention to models that are attractive, similar to them, or

prestigious, and are rewarded for their behaviors. This explains the appeal that athletes have on the behavior of young children and that successful adults have on college students. Unfortunately, this aspect of modeling can also be used in detrimental ways. For example, if young children witness gang members gaining status or money, they may imitate those behaviors in an effort to gain similar rewards.

Retention

The second requirement of observational learning is being able to remember the behavior that was witnessed. If the human or animal does not remember the behavior, there is a less than probable chance that they will imitate it.

Ability

This requisite of behavior concerns the physical and mental ability of the individual to copy the behavior he or she observed. For instance, a young child may observe a college basketball player dunk a ball. Later, when the child has a basketball and a goal, he or she may attempt to dunk a ball just like the college player. However, the young child is not nearly as physically developed as the older college player and, no matter how many times he or she tries, will not be able to reach the basket to dunk the ball. Similarly, a young colt observes another horse in the herd jump over the creek while running in the pasture. After observing the model's jumping behavior, the colt attempts to do the same only to land in the middle of the creek. He simply was not big enough or did not have long enough legs to clear the water.

Motivation

Perhaps the most important aspect of observational learning involves motivation. If the human or animal does not have a reason for imitating the behavior, then no amount of attention, retention, or ability will overcome the lack of motivation. Bandura identified several motivating factors for imitation. These include knowing that the model was previously reinforced for the behavior, being offered an incentive to perform, or observing the model receiving reinforcement for the behavior. These incentives can also be negative motivations. For instance, if the observer knew that the model was punished for the behavior, threatened for exhibiting the behavior, or observing the model being punished for the behavior then the probability of mimicking the behavior is less.

APPLICATIONS OF OBSERVATIONAL LEARNING

Modeling has been used successfully in many therapeutic conditions. Many therapists have used forms of modeling to assist their patients to overcome phobias. Systematic desensitization is a form of modeling behavior. For example, adults with claustrophobia may observe a model in a video as they move closer and closer to an enclosed area before entering it. Once the model reaches the enclosed area, for instance a closet, he or she will open the door, enter it, and then close the door. The observer will be taught relaxation techniques and be told to practice them anytime he or she becomes anxious while watching the film. The end result is to continue observing the model until the person can enter the closet himself or herself.

Bandura's findings in the bobo doll (an inflatable doll with a rounded bottom that pops back up when knocked down) experiments have greatly influenced children's television programming. Bandura filmed one of his female students physically attacking the bobo doll. The student was placed in the room with the bobo doll. She punched the doll, yelled "sockeroo" at it, kicked it, hit it with hammers, and sat on it. Bandura then showed this film to young children. Their behavior was taped when in the room with the doll. The children imitated the behaviors of the female student and at times even became more aggressive toward the doll than what they had observed. Another group of young children observed the female student being nice to the doll. Ironically, this group of children did not imitate the positive interaction of the model. Bandura conducted a large number of varied scenarios of this study and found similar events even when the doll was a live clown. These findings have prompted many parents to monitor the television shows their children watch and the friends or peers with which they associate. Unfortunately, the parental saying "Do as I say, not as I do" does not hold true for children. Children are more likely to imitate the behaviors versus the instructions of their parents.

One of the most famous instances of observational learning in animals is the great tit, a small European bird. During the 1930s and 1940s, people had their milk delivered to their doors. Many people began to

report that the cream from the top of their milk was being stolen. The cream-stealing incidents spread all over Great Britain. After much speculation about the missing cream, it took over 12 years to discover that the great tit was the culprit. Specifically, one bird had learned to peck through the cardboard top of the milk container and suck the cream out of the bottle. It did not take long before other great tit birds imitated the behavior and spread it through the country.

Finally, a carwash owner in the United States reported that the coins from his machines were disappearing. The law enforcement authorities soon set up a video camera system to catch the crook. What they discovered was another instance of observational learning. A crow had managed to crawl up into the coin machine and obtain a coin. Other crows observed this behavior and began to imitate the model. Soon, many other crows gathered around the machines and drained them of all of the change. The carwash owner was forced to change the design of the machines to keep the "coin thieves" out of them.

—Sherril M. Stone

See also Theories of Development

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OBSESSIVE-COMPULSIVE DISORDER

Obsessive-compulsive disorder (OCD) is a complex and highly heterogeneous psychological condition. It is classified in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* as an anxiety disorder. In the most generic terms, the DSM defines OCD along two major dimensions: obsessions and compulsions. Obsessions are intrusive and unwanted thoughts, and compulsions are ritualistic behaviors carried out to alleviate the anxiety caused by obsessions. In most cases, the OCD sufferer can recognize the obsessions as irrational and the compensatory compulsions as being ill-equipped to remedy the problem at the core of the obsession. A diagnosis of OCD may be made based on the presence of obsessions or compulsions, although most cases have both. Furthermore, most individuals with OCD experience significant interference in daily functioning as a consequence of their symptoms. OCD has an estimated lifetime prevalence of 2% to 3%.

ETIOLOGICAL FACTORS

OCD has been suggested to result from a complex array of genetic-biological and environmental factors and maintained as a result of avoidant coping behaviors and impairments in neuropsychological functioning. Although it does appear that OCD sufferers often have a first-degree relative with either an anxiety or mood disorder, evidence supporting the hereditability of OCD has been mixed. Biological hypotheses suggest that individuals with OCD have either low baseline serotonin levels or unusually fast reuptake of serotonin. The implication of serotonin in OCD is similar to its role in other anxiety disorders and mood disorders. That is, individuals with these conditions (OCD, other anxiety disorders, mood disorders) have either lower levels of serotonin or reuptake of serotonin that is faster than normal. However, the evidence has strongly favored serotonin reuptake inhibitor medication for OCD over all other classes of medication. Finally, a global neuropsychological deficit has been suggested in the literature. Specifically, organizational strategy, in an interaction with memory functioning, appears to be impaired among individuals with OCD, leading potentially to poorer functioning in appraisal of threat.

Although there is a prominent role for biological theory in the etiology of OCD, there is also a well-developed cognitive-behavioral perspective on this condition. In its current form, it is assumed that the OCD sufferer has a tendency toward developing the condition, akin to a biological diathesis. Following a critical event or stressor, maladaptive cognitive biases result in an exaggerated estimate of threat. Among the dimensions most commonly identified as cognitive biases among individuals with OCD are the following:

- Inflated sense of responsibility
- Need to control thoughts and overimportance of thoughts
- Overestimation of threat
- Intolerance of uncertainty
- Perfectionism

Each of these automatic thoughts can lead to specific strategies that foster ritualized behavior, obsessional ideas, or both. Given that the OCD sufferer begins to engage in a process that alleviates the anxiety associated with obsessions by specific cognitive and behavioral strategies, these rituals become reinforced and serve as an additional maintaining factor in the condition. Although engaging in rituals may result in an immediate reduction in anxiety, the net long-term effect increases both the frequency and intensity of anxiety associated with the individual's obsessions.

SYMPTOMS OF OCD

As noted earlier, OCD is a heterogeneous disorder, not only because of the wide diversity of perspectives on the condition that have gained prominence, but also in the symptom presentation. Numerous studies have attempted to determine subtypes of OCD, with little consensus on distinct categories within the larger diagnosis of OCD. However, there have been numerous studies that have determined dimensions of symptoms. These symptom dimensions fall into the following categories:

- Obsessions (sexual, aggressive, religious, or somatic) and checking, safeguarding, or undoing rituals
- Symmetry obsessions, and counting, ordering, or arranging rituals
- Contamination and cleaning
- Hoarding and collecting

These dimensions are not mutually exclusive. Indeed, the search for mutually exclusive categories within the larger diagnosis of OCD has only been the subject of recent investigations, using procedures designed to specifically identify distinct subgroups. One such study of individuals with OCD found that although dimensional models of OCD were generally superior, distinct subgroups were identified for importance or control of thoughts, checking, and pure obsessions (i.e., obsessions without compulsions).

TREATMENT AND TREATMENT EFFICACY

Most research has focused on the efficacy of either cognitive-behavioral therapy or serotonin reuptake inhibitor medications. Each has been shown effective in alleviating symptoms, although some important caveats are in order. First, there is differential response to treatment based on the dimensions of symptoms targeted. Second, the condition is largely considered chronic, therefore requiring ongoing management. This requires attention not only to how each therapy session is structured but also to activities between sessions designed to maintain gains and to regularly occurring booster sessions after acute treatment has ended. Third, a significant subgroup of sufferers does not respond to treatment, drop out, or respond only partially. Finally, variants of OCD exist that further complicate treatment, such as the presence of overvalued ideas. Briefly, overvalued ideas are transient delusional-like obsessions, whereby the OCD sufferer strongly believes that the feared outcome will occur if the ritual is not completed. The presence of overvalued ideas has generally been associated with poorer treatment outcome.

Cognitive-behavioral treatment generally involves two major components. The first is *exposure with response prevention* (ERP). The specific features of this approach involve identifying stimuli that trigger avoidance out of a concern that an obsession will be provoked, and possibly lead to a compulsion. After exposure to the stimuli, rituals are blocked, creating essentially a prolonged exposure period because the compulsion serves the purpose of blocking or undoing the stimulus exposure. An example of this procedure is as follows: an individual with contamination fears and associated cleaning rituals is exposed to dirt. One might begin with instructing the patient to come in contact with an item that is deemed contaminated to a low degree (i.e., a doorknob). Following this, the patient is instructed to avoid washing and to instead focus on the dirt and contamination. After a period of time, the anxiety that results from this exposure diminishes. This anxiety reduction, or habituation, follows well-known decay patterns (see Figure 1).

ERP has been examined in numerous trials and has been accepted as an empirically supported treatment for OCD in general, with highly positive effects. However, it has also been noted that ERP may deter many OCD sufferers from beginning treatment, with estimates of as many as 25% of sufferers refusing

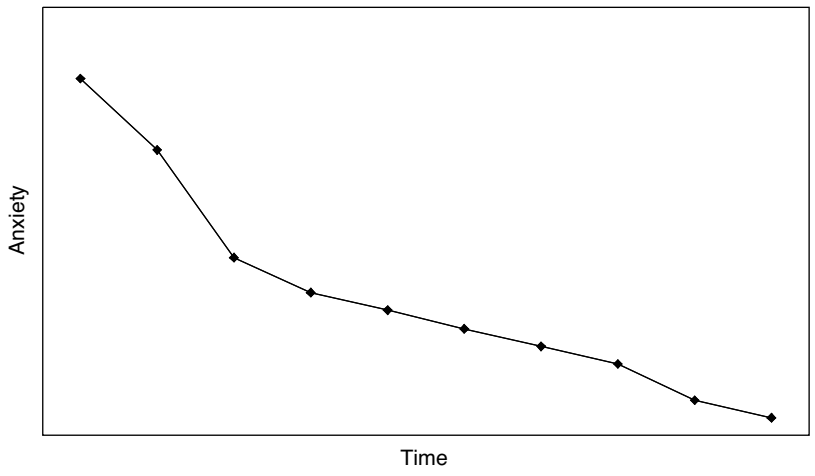

Figure 1 Decay of Anxiety With Prolonged Exposure Plus Response Prevention: Theoretical Curve

treatment and an additional 12% failing to complete treatment. The process of ERP is often a frightening prospect, referred to by one of our patients as "white-knuckle therapy" because of the anxiety evocation and prolonged prevention of rituals in order to produce a therapeutic effect.

The introduction of cognitive therapy, specifically tailored to OCD, has allowed for some patients to engage more readily in treatment by reducing some of the apprehension engendered by the prospect of ERP. Cognitive therapy for OCD typically focuses on managing the obsessions and the aforementioned cognitive biases associated with the disorder. An important part of this treatment involves putting the intrusive thoughts into proper context compared with the general population. Specifically, it has been observed that a large percentage of the population experiences obsessions from time to time. Several "main assumptions" in the cognitive model of OCD have been documented as follows:

- Normalization of mental intrusions
- Role of faulty appraisals
- Differentiating appraisals
- Neutralization strategies
- Exaggerated mental control
- Core dysfunctional beliefs (adapted from Clark, 2004, p. 188)

Each of these areas is an important focus in cognitive therapy. For example, faulty appraisals (i.e., "I must not think about possibly harming anyone because that would increase the likelihood that I will hurt another") would be important to target directly in treatment, and changing these appraisals reduces the persistence of obsessions. Likewise, many OCD sufferers engage in neutralizing strategies (e.g., "If I think of a positive image immediately after the obsession, it will go away") that paradoxically increase the frequency and intensity of obsessions. These strategies are then the target of intervention and eliminated. This is similar to excessive mental control.

Despite the heterogeneity of OCD, ERP has been shown effective in patients who enter and complete treatment. Likewise, there is increasing evidence for the effectiveness of cognitive therapy for OCD, regardless of dimension of symptoms. With increased attention to subgroups and dimensions of OCD, treatment is expected to continue its evolution to increasingly specific forms.

—Dean McKay and Kevin McKiernan

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OLDER ADULTHOOD

In 2003, 12.4% of the U.S. population was 65 years or older, 14,888,185 were men, and 20,990,487 were women. Understanding the impact of age-related changes on individuals becomes important as more and more live to old age. It is important to differentiate between normal, or primary, aging, and non-normal, or secondary, aging. Primary aging refers to age-related changes that are universal, intrinsic, progressive, and deleterious. Universal changes occur in all people; intrinsic changes are processes that occur exclusively within the person's body; progressive changes are processes that have a gradual and cumulative onset; deleterious changes are negative changes. Secondary aging refers to changes due to disease.

AGE-RELATED PHYSICAL CHANGES

Changes in our physical features are the most obvious age-related changes. The hair becomes thinner and grayer. Cartilage in the face accumulates, and the nose grows wider and longer, the earlobes fatten, and the ears grow longer. Wrinkles and age spots appear. Shoulders narrow, chest size grows, and the pelvis widens. The flat stomach of our youth is harder to maintain as the muscles in the gut slacken. Weight increases until about age 50 and declines somewhat after that. Fat decreases in the face, legs, and lower arms and increases in the abdomen, buttocks, and upper arms. We shrink in height because the back muscles weaken and the discs between the bones in the spine deteriorate. Women's genitalia decrease in size. Men's scrotums hang lower.

AGE-RELATED SENSORY CHANGES

Age-related changes occur in all of the sensory systems. In vision, changes in transmissiveness, or the degree to which light can pass through the eye, and in accommodative power, or the eye's ability to focus, result in problems involving distance vision, binocular depth perception, sensitivity to glare, and color sensitivity. The cornea, which is the major refracting structure of the eye, loses its luster, develops an opaque gray ring around its outer edge from an accumulation of fatty particles, decreases its curvature, and increases its thickness. These changes result in increased astigmatism and blurred vision. Loss of muscle tone in the ciliary muscles, which attach to the lens and cause it to focus vision at different viewing distances, reduces accommodative power, making it difficult to see nearby objects. The lens, which is responsible for focusing light on the retina, receives less light because the size of the pupil decreases. Because the lenses yellow with age, the light transmitted is less clear. The vitreous humor, a gelatinous fluid in the rear chamber of the eye, becomes thinner with age, resulting in an increased susceptibility to glare. These changes in vision have significant effects on one's ability to manage the environment. Older adults need more light to see. They are more sensitive to glare; hence, bright sunlight and headlights at night are problematic. They lose the ability to focus on nearby objects, and it takes longer to refocus from near to far or vice versa. This creates problems with driving, which involves constant refocusing. Decreases in acuity, or the ability to resolve detail and discriminate among visual patterns, affect the ability to read small print, such as labels on medicine bottles.

Hearing problems are the most frequent type of impairment reported by older adults. Presbycusis, a hearing loss attributed to age effects, is impossible to distinguish from hearing loss caused by secondary aging. Men can hear lower tones better, whereas women are better with higher tones. The vestibular system is responsible for keeping track of the body's orientation in space. Presbyastasis, or age-related changes, are similar to the sensory and neural changes that occur with hearing. Decrements can occur from secondary effects such as head injuries. These changes result in vertigo, dizziness, and body sway. Falls can result from loss of balance related to these effects and can be life-threatening events. The somesthetic system conveys information about touch, pressure, pain, kinesthesis (body position), and ambient (outside the body) temperature. As we age, we are less sensitive to cold and heat; thus, there is an increased risk for frostbite and heat stroke. The general trend of the literature is that there are no age effects for pain sensitivity.

AGE-RELATED CHANGES IN COGNITIVE ABILITIES

Although physical decrements are a feared component of aging, perhaps the most disturbing are potential cognitive decrements. Psychologist K. Werner Schaie found that reliable decrements do not occur for all abilities in all people. It is only very late in life that decline becomes likely, and then it is most evident in abilities for which speed of response is involved. However, secondary aging effects occur for individuals who have severe cardiovascular disease and for those who live in deprived environments. Substantial differences occur among individuals in whom skills decline, as well in how much they decline. In general, for those older adults with no organic brain disease or damage memory, loss is not a problem. Some studies find that older adults have better functioning memories than do younger adults. However, older adults are more likely to be concerned when they forget something. On the other hand, serious and debilitating memory problems are associated with a variety of organic brain diseases. These are disorders associated with some physical cause, such as brain damage. The brain damage can be caused by factors external to the person, such as motorcycle accidents or lead poisoning, or to internal factors, such as drug-related factors or Alzheimer's disease.

AGE-RELATED CHANGES IN SOCIAL FUNCTIONING

Physical and cognitive functioning is determined in large part by physiological factors. Social functioning, on the other hand, is largely determined by cultural factors. We will examine age-related changes in a variety of areas. In 2000, there were 10,049,182 men and 7,781,351 women older than 65 who were married and living with their spouse. Recent evidence suggests that marital satisfaction drops rapidly over the first 10 years of marriage and then declines more gradually in the remaining years. On the other hand, most older adults evaluate their marriages as happy or very happy, and marital adjustment seems to be stable over time in enduring relationships. As people live longer, more older partners end up caring for each other, often for long periods. Spouses, particularly wives, are the primary caregivers, with children the secondary caregivers. Interest in sexual activity remains fairly high throughout adult life, declining only gradually in the later years. In a Duke University longitudinal study of adults ages 60 to 94, 50% of individuals 80 years and older reported still having sexual desires. Lack of a partner is the most common reason given by women for stopping sexual activity, whereas for men, it is health.

An American myth is that adult children have abandoned their parents in their old age, particularly in comparison to earlier days. Although the proportion of older adults living with their children has declined over the past century, this reflects the increased financial independence of older adults. Frequency of contact between older parents and a middle-aged child remains high. Nearly 80% of older parents have contact with their middle-aged child biweekly. About 75% of Americans older than 65 are grandparents. The stereotypical portrait of a grandmother is that of an elderly, white-haired woman baking cookies. Grandmothers no longer fit a single pattern. Many middle-aged grandmothers work outside the home. They often are caregivers for their elderly parents. Grandparenting styles vary widely. The formal grandparent is concerned about the grandchildren but is not deeply involved in their care and guidance. The fun-seeker grandparent maintains a friendly, playful relationship with the grandchild. The surrogate parent, often a grandmother, assumes child care responsibilities when the mother is employed or otherwise engaged. The reservoir of family wisdom, often a grandfather, teaches skills or provides resources. The distant figure sees the grandchild only on holidays and special occasions. Most

older people have at least one living sibling, and they see these siblings several times a year. Very few siblings lose contact with one another, and the relationships are supportive and affectionate. Relationships with sisters are important in old age. Because men die at a younger age than do women, men in old age have smaller numbers of same-sex friends than women. Women are more likely to initiate new same-sex friendships. On the other hand, men are more likely to establish new cross-sex friendship, because of the disparity in the number of older women and men.

In 2000, there were 1,999,187 men and 9,333,130 women older than 65 years who were widowed. In general, widowhood has a more adverse effect on men than on women. For example, death rates of widowed men who remarry are lower than those of men who do not, whereas death rates do not differ for women. The effects on women are more likely to be economic. Widowhood reduces women's living standards by 18% and pushes 10% of women whose incomes were above the poverty line before widowhood into poverty. In 2000, there were 965,487 men and 1,555,680 women older than 65 who were divorced. Divorce has many economic, social, emotional, and psychological effects on individuals, but these are most serious for older women. Women of all ages emerge from divorce with a lower income and a lower standard of living. They may lose their rights to their husband's pension, Social Security, life insurance benefits, and health care coverage. Older women are often described as "only one man away from poverty."

Much of what we know about the effects of retirement is based on studies of men. Although retirement has positive effects related to more control over use of time, there also are negative effects, such as increased psychosomatic symptoms and decreased income. Retired women are more likely than retired men to report that their incomes are inadequate. Women are less likely than men to be covered by private pension plans. In general, satisfaction in retirement is associated with good health, adequate income, and a high activity level.

AGE-RELATED CHANGES IN EMOTIONS

Although older adults are often perceived as having blunted and impoverished emotions, research indicates that there is a continuity of emotional feelings and expressions across the life span. No age-related differences in the intensity of positive or negative emotions, in hedonic tone, or in specific emotions or emotional control have been found. This is particularly so with men. However, the complexity of emotional experience and improvement in emotional regulation are enhanced with age.

In summary, it is important to remember that we all have age-related changes. However, when these changes occur and the extent to which they occur vary substantially among individuals. Factors reaching back prenatally, such as mother's nutrition, and as recent as last year, such as death of a spouse, and as varied as our genetic heritage and the socioeconomic climate of our nation interact to affect our life and our death.

—Virginia Norris

See also Activities of Daily Living (ADLs), Older Americans Act, Oldest Old Age

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OLDER AMERICANS ACT

The Older Americans Act (OAA) became law in 1965, the same year as the passage of Medicare and Medicaid, as part of the Great Society envisioned by President Lyndon Johnson. The programs associated with this Act enable older people to remain longer in their homes and communities and to delay or eliminate the need for institutionalization, such as in a nursing home. The Act has been reauthorized or renewed by Congress 14 times, most recently in 2000.

The programs resulting from this Act are reflected in the names of the following Titles or sections of the Act: Grants for State and Community Programs on Aging; Training, Research, and Discretionary Projects and Programs; Multipurpose Senior Centers; National Older Americans Volunteer Program; Nutrition Program for the Elderly; Community Service Employment for Older Americans; Grants for Native Americans; and Allotments for Vulnerable Elder Rights Protection Activities.

An additional OAA Title established the Administration on Aging (AoA) within the federal agency currently named the Department of Health and Human Services (DHHS). The AoA carries out or oversees the implementation of the Act's provisions through a network of national, regional, state, and local or tribal agencies. Until 1993, the organization was administered by the AoA Commissioner. At that time, this position was elevated to that of the Assistant Secretary of Aging who reports directly to the Secretary of DHHS.

The Secretary of Aging approves each state's plan that establishes a single state agency to administer or oversee the administration of the state plan. This agency coordinates the state's efforts related to the Act. Local advisory councils, which are composed of older people who either access OAA services or who are eligible to do so, help to guide the Area Agencies on Aging (AAAs or "triple As") in the development of their local plan.

AAAs are responsible for local-level implementation of the OAA. Their goal is to develop or enhance a comprehensive set of services for older people in the geographic area served by the agency, with the intent of assisting older people to receive services they need to remain, with dignity, in their homes as long as possible. Older individuals tend to prefer to live in their homes and to function as independently as possible for as long as possible. Because of the current, fragmented nature of the long-term care system, however, the task of developing a coordinated, comprehensive system of care can be daunting.

AAAs typically contract with local public or not-for-profit providers for the services they fund. Although some services can vary from state to state, typical home- and community-based services include home care, congregate and home-delivered meals, adult day services, health promotion, legal assistance, and protection from abuse, neglect, and exploitation. Funded in-home care is not medically oriented but rather long-term care focused and includes assistance with activities such as bathing, dressing, eating, grocery shopping, cooking, toileting, and getting from place to place. Supportive services for informal caregivers are provided through the National Family Caregiver Support Program. State ombudsmen are advocates for residents of long-term care facilities. They respond to individuals' complaints about the facilities in which they reside.

—Cynthia Massie Mara

See also Older Adulthood, Oldest Old Age

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OLDEST OLD AGE

Determining when a person is considered old can be based on a variety of factors, including physical health, chronological age (i.e., actual age), and how successfully a person is able to function in his or her environment. Within the context of aging, establishing when a person becomes old, or very old, depends on who or what is being considered. The acceptable cutoff points used by researchers in the field of gerontology and federal agencies tracking demographics will sometimes vary, but these groups generally follow a similar method in establishing who is considered to be old (i.e., 65, 75, 85, etc.).

It has only been in the past 30 years that research and discussion beyond the age of 65 has occurred when describing the benefits and challenges of aging. Most discussions about the older population have tended to look at aging as a homogeneous experience that lacks any really individual differences. Yet, when one stops to consider the number of older persons, especially those 85 and older, it becomes apparent that discussions of aging require further consideration of the unique qualities of this segment of the population, particularly when considering the potential for more than one generation or cohort of persons. Indeed, it is becoming common to have four generations in a family, and it is also quite possible to have a parent and his or her child occupying the period of senescence at the same time.

OLDEST OLD DEFINED

When Bernice Neugarten first described the existence of more than one generation within the older population, she spoke of two groups. The first group, the young-old, consisted of people 55 to 74 years of age who were either nearing retirement or had started the retirement experience. The other group, the old-old, comprised the oldest category of the aged population consisting of people 75 years and beyond. At the time of her writing, setting an upper threshold of 75 and older seemed to make sense because the numbers of people 75 and older was somewhat limited owing to higher mortality rates in the older population.

However, since the 1960s, the number of people older than 75, 85, and even 100 has shown tremendous growth. Reasons for this growth include high fertility rates up until the late 1920s and decreasing mortality rates among people beyond the age of 75. Indeed, these factors have made it necessary to further define an aging population based on the expansion of one of its fastest growing segments. Because the changes that tend to be associated with old age are more prominent in people older than 85 (e.g., physical and cognitive changes), creating a separate category is of value to the study of aging. Old age is no longer confined to a period of 10 or 15 years; rather, it can and does include an additional 20, 30, or even 40 years of life.

Since suggesting the possibility of there being more than one generation or cohort of older persons, federal agencies like the U.S. Census Bureau, national aging organizations (e.g., American Society of Aging, Gerontological Society of America, American Associations of Retired Persons) and researchers in the field of aging have further segmented the older population to consist of another category of older people extending beyond the age of 75. This category, referred to as the *oldest old*, comprises people who are 85 years of age and older. Other sources, such as the United Nations, have also taken a broader view of aging to include people older than 80 as the oldest old group and use this as their starting point in describing this segment of the population.

Table 1 Growth of the Oldest Old Population

Year	*Number of Persons 85+*	*Percent of Population*
1900	122,000	0.2
1910	167,000	0.2
1920	210,000	0.2
1930	272,000	0.2
1940	365,000	0.3
1950	577,000	0.4
1960	929,000	0.5
1970	1,409,000	0.7
1980	2,240,000	1.0
1990	3,021,000	1.2
2000	4,240,000	1.5
Projected		
2010	6,123,000	2.0
2020	7,268,000	2.2
2030	9,603,000	2.6
2040	15,409,000	3.9
2050	20,861,000	5.0

SOURCE: Adapted from the Administration on Aging using middle series projections of the U.S. Census Bureau.

DEMOGRAPHIC PROJECTIONS

The oldest old constitute one of the fastest growing groups in the United States and one of the fastest growing segments of the population in the world. A review of U.S. population totals since 1900, including both actual and projected, illustrates this tremendous growth. In 1900, there were 122,000 people 85 years of age and older, whereas in 2040, it is projected that 15 million people will be 85 years of age and older. Reasons for the anticipated future growth include the increase in fertility following World War II (1946–1964), commonly known as the baby boom, and continued decreases in mortality at older ages. Possible explanations for the decline in mortality at older ages are varied, ranging from a healthier group of people living to the oldest old age category, to a general slowing down of the overall metabolism of an aged person that contributes to a reduction in deaths. Table 1,

adapted from the U.S. Administration on Aging data, highlights the growth of the oldest old population.

In addition to the growth in the United States, several countries, especially those in Western Europe, including Germany, the United Kingdom, Italy, and France, are experiencing growth in their oldest old population. Other countries experiencing a similar growth in their oldest old population include India, Japan, Pakistan, and Russia. Of these countries, Japan is expected to experience the greatest increase in its oldest old population, with a significant portion of its elderly (40%) being 80 years of age and older in the next 30 years. Explanations for the increase in the oldest old population worldwide are similar to what has been found in the United States. These include the increased fertility following World War II and the decrease in mortality rates in the older segments of their respective populations.

Although this entry focuses on those 85 years and older, it is worth noting that the growth in the oldest old population also includes centenarians, people 100 years of age and older, who represent an increasing portion of the older population. A total of 50,454 people 100 years of age or older were counted as part of the 2000 U.S. census. Like the 85 years and older population, the number of people 100 years and older is expected to grow substantially over the first half of the 21st century. Using middle series projections, the U.S. Census projects the number of centenarians to increase to 800,000 by 2050.

GENDER DIFFERENCES

Whether one is examining the effects of aging on a person who is 85 or 100 years of age, similar factors emerge. In contrast to their female counterparts, the survival rate for men declines appreciably after the age of 65. With increasing age, the ratio of men to women becomes larger. This is especially evident among the oldest old. In 2002, for persons 85 years of age and older, there were 46 men for every 100 women. This is in contrast to a ratio of persons 65 to 75 years of age, in which there were 83 men for every 100 women. There is a similar decline in the ratio of men to women in the oldest old age group in other countries. According to the United Nations, the worldwide ratio of men to women is similar to the U.S. experience, with 53 men older than 80 for every 100 women older than 80.

An obvious outgrowth of the declining number of males in the oldest old age category is the prevalence of widows at 85 and beyond. Although men tend to be disadvantaged from a life expectancy standpoint, they actually are at an advantage from a marital standpoint. For the oldest old in 2002, 58% of men were married, whereas the proportion of married women was only 12%. The number of females who were widowed at 85 and older is quite striking; the percentage of women who were widowed in 2002 was 79%, whereas for men, about 34% of men had no spouse living. With such a high concentration of widows in the oldest old category, it is reasonable to conclude that they are spending a significant portion of their older years alone. For those who become ill and require assistance, the lack of a spouse can be fairly critical for people who may not have any other support system available to them. Although men can look to their partner to provide care in their later years, this is often not an option for women.

In addition to not having a spouse in their older years, women may face an unusually difficult time with finances in their older years. Whether or not they have access to benefits including Social Security, pensions, and savings may depend on their financial health and that of their spouse earlier in life. Also, women who are faced with multiple chronic illnesses in their oldest old years find their financial resources may be depleted. In the United States, the older a woman is, the likelier she is to be poor.

MORTALITY OF THE OLDEST OLD

For some time, people who live to the age of 85 and older have been considered to be an exceptional group for having survived that long. Most deaths in the older population tended to occur before the age of 85. However, this appears to be changing, with more people living to 85 years and older. Although life expectancy continues to increase with each year (indeed, life expectancy at birth for 2004 increased to 77.4 years for all people), there are still those who succumb to such illnesses as heart disease and cerebrovascular disease before reaching the oldest old years.

Of those who are able to survive to the age of 85 years or older, people within the oldest old age group die from conditions that reflect both overall physical decline and the consequences of more than one chronic condition, more commonly referred to as *comorbidity* or multimorbidity. The top five leading causes of death for the oldest old are more the result of a chronic long-lasting condition or conditions than acute episodes. The only exception to this typically is an acute condition such as pneumonia or influenza. The leading causes of death include cardiovascular diseases, especially

atherosclerosis, congestive heart failure, and ischemic heart disease; malignant neoplasms, including cancers of the digestive system, breast, and prostate; cerebrovascular disease (such as stroke); Alzheimer's disease; and pneumonia or influenza. It is interesting that Alzheimer's disease as a cause of death has begun to appear more frequently in the oldest old. Late-onset Alzheimer's disease is increasingly common, because of both the nature of the disease and the aging of the population.

In addition to the causes of death described previously, there are other unique characteristics of mortality in the oldest old age group. An interesting phenomenon occurs at about the age of 85, when the life expectancy of older blacks begins to exceed the life expectancy of older whites. When making comparisons based on race alone, the life expectancy of blacks at 85 consists of an additional 6.7 years, whereas the life expectancy of whites is an additional 6.4 years. This difference continues up until 100 years of age, at which time estimates of life expectancy are no longer readily available. It is interesting to note that this racial crossover occurred at an earlier age (i.e., in the 70s) several decades ago, but now, as both groups are gaining in terms of their overall life expectancy, this crossover is not taking place until people are in their 80s.

Although not listed among the top five causes of death, it is noteworthy that the suicide rate of the oldest old population is the highest of all age groups, especially for white males. The second highest suicide rate is found in men 75 to 84 years of age. Older people, in particular the oldest old, have consistently had an unusually high suicide rate since 1950. Like other age groups, people within the oldest old age group tend to use more lethal methods such as firearms to end their lives and are more likely to be successful in their efforts than are younger age people. The tendency toward selecting more lethal means is found for both males and females. In addition to more overt methods, the oldest old also engage in indirect self-destructive behaviors (e.g., medication noncompliance, refusing to eat or drink) when no other option is available to them or when there is concern about what impact a suicide will have on family and friends.

PHYSICAL CHANGES

As noted earlier, one factor that has contributed to the increase in the numbers of oldest old is reduced mortality and morbidity rates in the older population. For many, living into the older years is a result of a decrease in mortality but an increase in more health-related conditions. A marker of aging is in the number of health conditions an individual may face. To be in the oldest old category may imply a decline in overall physical functioning, especially in one's ability to perform one or more activities of daily living (ADLs). ADLs include such tasks as bathing, dressing, feeding, toileting, and getting in and out of bed. For people older than 85, the number of ADL limitations increases with age. Reliance on family, friends, and neighbors becomes more of a reality for this age than for others.

When asked to rate their overall health as part of the National Health Interview Survey, 65% of men and 65% of women older than 85 rated their health as excellent or good. This is in comparison to people 75 to 84 years, of whom 68% of men and 70% of women rated their health as excellent or good. The positive assessment of overall health by the oldest old seems to suggest that perception is reality, particularly for those who may compare their own overall health to that of their peers. It is especially thought provoking to encounter a person older than 85 who comments that he or she does not want to be with a "bunch of older people" despite his or her obvious physical limitations.

Although optimistic self-reported health among the oldest old may suggest an absence of illness or disability in this group, upon further inspection, one finds that people older than 85 are more likely to experience the effects of one or more chronic illnesses late in life. They are also likely to become frail; with advancing age, this can result in a failure to thrive for some very old individuals.

The types of conditions most often found prevalent among the oldest old are also found in the young old; however, the extent and impact of symptoms is much greater. The recent findings of various longitudinal studies suggest that as one reaches the age of 85, the incidence of illness becomes greater and the ability to recover from an illness or illnesses becomes diminished.

An estimate of the most prevalent chronic conditions experienced by the oldest old between 1997 and 2001 offers an interesting glimpse into the problems facing this age group. The conditions, in order of prevalence, include the following: hypertension, arthritic symptoms (most commonly osteoarthritis), heart disease (all types), cancer, ulcer, sinusitis, stroke, and diabetes. Other conditions include hay fever, asthma, bronchitis, emphysema, kidney disease, and liver disease.

Also prominent among the oldest old are conditions of the bone, such as osteopenia and osteoporosis. The

loss of bone mass is a contributor to the fractures experienced by the oldest old, especially hip fractures that occur among women. Other musculoskeletal changes include loss of muscle mass, or sarcopenia. The loss of bone and muscle mass also affect the decrease in height that occurs with age. The oldest old often experience changes of their respiratory system (e.g., decreased vital capacity, increased residual volume), decreased functioning of the gastrointestinal system, and an increased incidence of urinary incontinence.

Changes that are most noticeable to the oldest old group are related to vision and hearing loss. Sensory losses include hearing impairment, including conductive and sensorineural hearing loss, and visual changes, which are the result of cataracts, macular degeneration, and glaucoma. In addition, problems with balance or postural stability also occur with advancing age. It is important to note that although each of these conditions can be disabling, some visual changes can be treated effectively in the oldest old.

Just as certain conditions can be treated in the oldest old, it is also possible for people to improve their overall physical functioning (i.e., muscular and bone strength) by engaging in various activities such as weight lifting and other exercises. Although the improvement derived from activity will not necessarily restore an 85-year-old person to the level of functioning enjoyed at an earlier stage of life, research has supported the notion of plasticity or modifiability even in very advanced age.

When a person does experience problems in overall health or suffers from the consequences of one or more disabilities or chronic conditions, the use of health care resources becomes necessary. Because of the number of chronic conditions faced by the oldest old, their use of health care resources is greater than other segments of the older adult population. Unlike other older adults, most health care dollars are spent on long-term care and nursing home costs, whereas the younger old spend more health care dollars on inpatient care and medical and outpatient services.

PSYCHOLOGICAL CHANGES

When compared with other age groups, the oldest old are at greatest risk for experiencing the effects of dementias such as Alzheimer's disease. The National Alzheimer's Association estimates that 50% of people older than 85 may have the disease. With the projected growth of the older population in the next 50 years, the numbers of people with Alzheimer's disease is expected to increase from 4.5 million in the year 2000 to 8.0 million in 2050. Alzheimer's disease is a progressive, irreversible brain disorder that affects an individual's short-term memory, language skills, social abilities, and everyday functioning. The course of disease results in people going through a series of stages that eventually result in the individual requiring 24-hour supervision and assistance in a nursing home or special care facility. The care of the person with Alzheimer's disease may be provided by family, or, in instances in which family is either unable or unavailable to serve as the primary caregiver, people in the later stages of the disease may be placed in a nursing home for the remaining time of their lives.

Other types of memory impairment, such as mild cognitive impairment, and moderate and severe memory loss also increase with age. Despite the greater potential for dementia and memory loss in the oldest old group, there are those who live to 85 and beyond and continue to function well with respect to intellectual skills and wisdom. Although deficits are found when various psychometric measures are employed, most of the oldest old are able to manage their day-to-day activities fairly well. For those with some impairment, the use of various strategies to compensate for loss (e.g., making lists) has been found to be useful. Although loss in this age group cannot be denied, the severity of the loss in terms of overall functioning may not be a negative consequence of aging if the person is able to remain independent in the community.

Older persons who rate their health as good or excellent tend to have a greater sense of overall well-being than their counterparts who are faced with multiple chronic conditions. It appears that people who maintain overall positive mental health tend to reap the benefits of this in the form of increased longevity. Major or clinical depression is a condition that is no more readily apparent in the older population in general than in younger groups. Yet, for people older than 85, the percentage with severe depressive symptoms does increase with age. This is especially important to note given the increased risk for male suicide later in life. The challenge for professionals working with the oldest old is in understanding the types of symptoms they may exhibit compared with other age groups. In addition, knowing

what effect a given treatment (especially medications) may have on them is the key to achieving success. For those who are feeling the effects of multiple losses in their lives, having someone to turn to in relaying these concerns is of value.

Relationships tend to change as a result of the aging process. Obvious reasons for these changes include illness, disability, nursing home placement, and death. For the oldest old, lifelong relationships with family and friends are often disrupted because of the factors listed. It is not uncommon to have a person in this age group outlive his or her siblings, a spouse, and, quite possibly a child or children. The loss of multiple support systems can be burdensome, particularly for those who turned to other family members for support and companionship. Also, the potential for this age group to maintain contact with others is hampered by the challenges of age that lead to decreased mobility and loss of transportation. Moreover, for individuals in this age group, traditional sources for making friends (e.g., workplace) are no longer possible because most have been out of the workforce for 20 years or more. Yet, despite these limitations, very old people are still able to make new friends and maintain contact with others. New friends may be acquired, although isolation and loneliness do increase with aging.

HOUSING AND LONG-TERM CARE

Unlike their young old counterparts, people older than 85 are more likely to move. The destination for this group tends to be a consequence of a decline in health or functional status rather than amenity moves for pleasure to places such as retirement communities or resorts. In some instances, a move after 85 is a second or third move in old age. For some, a move to a retirement community has already taken place. However, because of changes in health status, the fit of the retirement community environment is no longer a match for the needs of the oldest old. Evidence of this second move in later life is reflected in the migration patterns of states such as Florida and Arizona that tend to attract a significant number of older persons at retirement but also have people leaving the state after the age of 85 to less mild locations like Minnesota, Alaska, and Colorado. There are several possibilities for this move late in life. Some of the reasons may include a change in financial status, widowhood, and a need to be closer to family, especially children or siblings for assistance later in life because of declining health and functional status.

Various types of housing options exist for people older than 85. Although many are able to live independently, others, because of a deficit in one or more areas of functioning, may need to consider other options. The choices that are available to the oldest old include staying in one's own house (which is most often preferred), moving to an apartment or condominium for those of all ages, moving to a community designated for people 55 and older, or moving to a higher level of care in a community that offers supportive services with both activities of daily living (ADLs) and instrumental activities of daily living (IADLs). ADLs include bathing, dressing, toileting, transferring, and eating; IADLs entail shopping, transportation, meal preparation, and bill paying.

Residential communities offering support with ADLs or IADLs are commonly referred to as *assisted living facilities*, *domiciliary care*, or *board and care homes*. For this review, assisted living is preferred. The concept of assisted living is relatively new, having started in the mid-1980s. Those living in an assisted living facility tend to be people who are not in need of nursing care but are in need of some assistance with their activities of daily living. People living in an assisted living facility need help with an average of 2.25 ADLs. The type of assistance needed is generally with bathing, medication, dressing, or using the toilet. Assisted living facilities enable older people, especially those older than 85 years, to remain outside of a nursing home and maintain a form of independence.

Assisted living facilities serve to support an increasingly aging population. The emergence of this level of service has enabled many of the oldest old to delay moving into a nursing home. They get support with such things as dressing and bathing but maintain some degree of independence. The types of support provided in assisted living facilities may include bathing, dressing, medication reminders, transportation, and assistance with shopping. Those who are no longer able to live in an assisted living facility tend to move on to nursing homes because they require a higher level of care.

The oldest old make up the greatest percentage of people living in nursing homes. The oldest old represent the largest share of nursing home residents, and most are women. The primary admission diagnoses

for the oldest old include diseases of the circulatory system (especially heart disease), mental disorders, diseases of the nervous system (including Alzheimer's disease), and injuries such as fractures of the neck or femur.

As are those living in the community, most of the oldest old residing in nursing homes are widowed. Nationally, 75.5% are widowed, whereas only 10.8 % are married. No longer having a spouse is one of the reasons used to explain why a person was placed in a nursing facility, rather than remaining in the community, where no other help was available. In addition, placement in a nursing home rather than an assisted living facility suggests that an individual is no longer able to care for himself or herself with respect to various ADLs (e.g., bathing, dressing, toileting). More recently, supportive services have allowed many older people to live in their own homes.

SUMMARY

As the fastest growing segment of the population, the oldest old offer an interesting perspective into the effects of aging. Future cohorts of this group will provide added insight into the consequences of both healthy and unhealthy behaviors over the life course and further support the notion of variability in advanced age. Although the oldest old experience a larger share of health problems than other age groups, especially conditions such as Alzheimer's disease, and, as discussed, are more likely to endure the effects of multiple losses, this age group is also able to demonstrate a great deal of resiliency and strength. As the baby boomers move into the period of senescence, they will bring with them different issues and challenges that may not have been evident among previous cohorts. Future research in this area will always be fertile ground for understanding the benefits and challenges of aging.

—Julie L. Masters

See also Activities of Daily Living (ADLs), Assisted Living, Older Adulthood, Older Americans Act

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ONLY CHILDREN

Scholars have been interested in only children for decades. Alfred Adler, a contemporary of Freud's, wrote about "family constellation" in the early 1900s. He was particularly interested in only children because he believed they were pampered and as adults had excessive entitlement and demands for attention. Walter Tolman later theorized that only children's lack of interaction with siblings led to poor conflict resolution and dogmatism in adulthood. In the 1980s, Margaret H. Hoopes and James M. Harper further developed a family systems perspective on only children. In this view, only children exhibit characteristics of first

children. Decades of research have proceeded from these three theories about only children. This entry examines findings about only children from the past two decades and identifies implications for development, social interaction, adult relationships, and theory.

Controversy still exists in comparisons of only children as adults with those who have siblings. Although popular myth portrays only children as spoiled and demanding, empirical studies over several decades in North America and other countries, especially China, indicate that only children are no worse off than children with siblings. In fact, they compare more favorably on several traits and less favorably on a few traits. In addition, only children are more like than different from first children.

Early studies of only children are suspect because of methodological flaws. Only children were grouped with first- or last-born children because only children can be viewed as both first and last. Another flaw was failure to differentiate family structure. The percentage of only children being raised in single-parent families is higher than it is for other children because divorce rates are higher in the early years of marriage, and yet research before 1990 lumped only children from two-parent and single-parent families together. Researchers also failed to identify children in blended families who may have lived most of their lives as only children before the remarriage.

Because of lower fertility rates in many countries, the number of only children has been increasing in most industrialized countries. Government policies in places like the People's Republic of China have encouraged smaller families, even one-child families, and as a result, Chinese only children are increasingly the subject of research. Another demographic pattern that affects studying only children is a higher divorce rate and higher rates of cohabitation, in which the average relationship lasts 3 years and produces one child, even in countries that previously had little or no divorce or cohabitation. Consequently, many only children are more likely to be raised by one parent than children two or three decades before.

RESEARCH FINDINGS IN THE PAST TWO DECADES

Most research findings refute the stereotype and Adler's assumption that only children are maladjusted. Consistent with the systems model of sibling position, findings generally confirm that only children are more like first children. Table 1 summarizes findings regarding cognitive and verbal functioning, achievement, interpersonal skills and attitudes, well-being and self-esteem, and emotional and mental health for only children.

Generally, only children fair better than their counterparts with siblings in areas of school performance, verbal ability, analytical abilities, self-motivation, and achievement in work and leadership. They fair worse than their counterparts in handling conflict with others in early childhood, and being slightly more self-centered, but these differences disappear in adulthood. As adults, only children tend to be less differentiated from their families of origin. These findings appear to be consistent across cultures, with the strongest conclusion being that only children do not differ from children who have siblings on most personality measures and measures of maladjustment. Few differences have been found between adults who are only children and adults with siblings.

Social and Cognitive Development

Several specific research findings illustrate the differences in the family context of only children and its impact on aspects of language, social, and cognitive development. Findings from a longitudinal study of only children from birth through 3 years of age indicated that mothers of only children look at and vocalize more with their infants than mothers with more than one child. In addition, more touching, rocking, kissing, and playing are exhibited by mothers with only children. School-age only children demonstrate increased verbal and analytic ability compared with other children, and this tends to be consistent into adulthood.

Social Interaction

Lacking the opportunity to interact with siblings, preschool-age only children exhibit more aggressive and disruptive behavior and less social competence with their peers in kindergarten and first grade. They are more emotionally sensitive to conflict and show poorer conflict resolution skills than their peers who have siblings, but these differences are not clinically significant and disappear by third grade. Although young only children tend to be more shy, they score

Table 1 Recent Findings Regarding Only Children

Cognitive and Verbal Functioning	*Achievement*	*Interpersonal*	*Well-Being and Self-Esteem*	*Emotional and Mental Health*
Only- and firstborns have larger vocabularies and only children outscore others in verbal achievement	High academic achievement	Expect others to be helpful and rewarding	Are not less happy or more lonely compared to children with siblings	In single-parent families, only children are at increased risk for developing mental disorders; their adjustment is more related to their parent's adjustment than for counterparts with siblings
Only children have better analytical and reasoning scores	More prevalence in political and professional positions even when control for proportion of birth order	Less prone to divorce; marry better-educated partners	Have as good or higher self-esteem than children with siblings	Only children are affected more in high-conflict families because they do not have sibling support to moderate the effects of the conflict
One-child families have more talk time during mealtimes in all socioeconomic groups and cultures	Only children go further in education than those with siblings	As adults, less need to affiliate with others	Score lower on measures of fear, anxiety, and depression than those with siblings	Scored more narcissistic but not clinically significant compared to those with siblings
Earliest memory 9 months earlier than those with siblings	Similar to first-borns in educational and occupational achievement	Socially shy and aggressive in early years but disappears with age		As adult children, have more poorly defined ego boundaries with parents
		Only children as parents cope less effectively with conflict between their children		
		As young children, have more imaginary friends; have a harder time individuating from parents		

lower on fear, anxiety, and depression than their peers in both the United States and China. Only children become less shy after they enter school. Not having siblings also affects only children's proficiency in sports and physical activities probably because they do not have siblings with whom to practice. Because sports are important to the socialization of middle school boys, this deficit has more impact on boys than girls. Studies of only children adolescents appear to indicate that very few differences can be found compared with peers. The only findings of significance are that only children adolescents score higher on tests of cognitive functioning and demonstrate less need to affiliate with friends even though they have comparable social skills.

Only children take longer to develop social competence, but by the time they reach third grade, differences between only children and other children in social competence, aggression, and interpersonal problem solving disappear. Only children appear to create more imaginary friends and are more like first children in this regard than later children. Only children are more likely to be aggressive with peers when they enter school, but this diminishes by later

grades. Chinese only children are more likely to be classified as "bratty" by their teachers in early grades. Although in one study school-age only children had the highest scores for aggression, victimization, and passive-withdrawal, they did not differ from children with siblings in numbers of mutual friends, loneliness, or self-esteem. Again, by adolescence only children appear to have developed skills in negotiating and managing conflict without resorting to more aggression or withdrawal, so that the differences that existed in early years do not continue into adolescence.

Adult Adjustment

Adults who are only children are well adjusted as a group and demonstrate high achievement, good verbal skills, self-confidence, and good self-esteem. However, as adults, only children who have primarily been raised in single-parent homes may be more at risk for emotional and mental struggles. Only children adults tend to score higher on measures of narcissism and show more self-focused orientation, but these do not appear to be clinically significant differences. More only children tend to occupy positions in clubs, organizations, and political office than other children, even when family size is controlled for. Adult only children tend to be less autonomous from their families of origin and score higher on measures of enmeshment with their parents, although there is some question about whether the measures of enmeshment might be more measures of closeness than dysfunctional enmeshment. When proportion of only children to other children is controlled for, adults who are only children fare as well, and possibly better, in marital happiness than adult children with siblings.

Some studies have suggested that there is a more than chance prevalence of only children who commit violent crimes, suffer from obsessive-compulsive disorders, and experience alcoholism. However, these studies have not controlled for the fact that there are more only children in the world. B. J. Rosenberg and Janet Shibley Hyde postulated that although research has treated the only child category as one homogeneous group, there are probably only children who are quite different from each other, and scholars should be considering how normal, well-adjusted only children differ from impulsive, acting-out only children. As researchers begin to make this differentiation, the likely explanation for differences in these subgroups will be family factors such as the influence of parent characteristics, which have a higher probability of affecting only children, and of family structure, that is, single-parent homes in which only children feel more anxiety about their parent's problems and emotions, and high-conflict homes in which only children lack the buffering influence of sibling support.

In summary, only children function better at all stages of development, refuting the public myth and Adler's stereotype of them as pampered and spoiled. In most aspects, they fair better than their counterparts with siblings, and more negative differences at early ages seem to disappear when they secure opportunities to interact with others in school. High achievement motivation and proficient verbal skills are characteristic of only children from first word to death.

—James M. Harper

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OPERANT CONDITIONING

Operant conditioning is the name of a process by which experience with consequences of behavior alters subsequent behavior, and it is one of the principal means by which we learn to interact with our world. It is also sometimes called *instrumental conditioning*. The word *operant* derives from "operate," in that it refers to activities that operate on the world. Similarly, *instrumental* is employed because the kind of behavior in question is instrumental in bringing

about some outcome. Consider the following scenario. An infant in a crib swings its right leg up about once every 10 minutes or so. Then a mobile is attached to the crib, and each time the baby swings its leg, the mobile moves. Soon the baby is swinging its leg several times per minute. The mobile is then removed, and leg swinging gradually returns to its previous frequency. The increase in the frequency of leg swinging is probably (see later) an example of operant conditioning, with leg swinging called the *operant response* and movement of the mobile serving as what is called *reinforcement*. The decrease in frequency when kicking is no longer effective is called *extinction* of operant behavior.

Stated more generally, operant conditioning is said to have occurred when some activity becomes more likely after it has been followed by a particular outcome. The activity is often referred to as the *response*, and the outcome is called the *reinforcer*, or reinforcing stimulus. Thus, if a response is followed by a consequence, and if as a result of that experience, the response becomes more likely, operant conditioning is said to have occurred, and the consequence is called a reinforcer.

HOW TO TELL WHETHER REINFORCEMENT HAS OCCURRED

Reinforcement, unfortunately for anyone trying to understand it, has two meanings. First, it refers to the presentation of a reinforcer after a response. Second, it is also sometimes the name for the result of that arrangement, as when one might say, "I gave my dog a treat each time it begged, and since then the dog has been begging like crazy. That's a clear case of reinforcement." The two uses, however, illustrate an important thing to know about reinforcement: it is defined after the fact (technically, it is functionally defined). Specifically, a consequence can be called a reinforcer for a particular activity only after it has been shown to be effective in increasing the probability of that activity when presented as a consequence of it. That means it would be incorrect to say, "I reinforced my dog's begging with a treat," if, after having given it treats each time it begged, begging did not happen more often.

Because it is functionally defined, some have criticized the concept of reinforcement as involving a "circular" definition. There is a sense in which this criticism is proper. Reinforcers are defined by their effects, not in advance. That fact makes it illogical to say, "Reinforcement did not work." The criticism, however, does not make the concept unscientific or useless. Compare the concept of force in physics. If a previously stationary object moves, then a force must have been applied to it because things do not move on their own. That is, force is defined by its effects, just like reinforcement is. Reinforcement, as a concept, shares another important similarity with the concept of force—it is widely applicable. An enormously extensive array of activities, ranging from the activity of a single muscle fiber to something as abstract as imitation, have been shown to be subject to reinforcement. Similarly, a broad array of consequences has been shown to be effective as reinforcement. Additionally, the process has been observed in a wide range of species of mammals, birds, and fish.

A definition of reinforcement, then, is as follows. If a response has a particular consequence and the response becomes more probable in the future, then reinforcement has likely occurred. It must also be shown, however, that the mere presentation of the event that serves as a consequence does not result in an increase in frequency of the activity. In our example, if simply moving the mobile without regard to the baby's actions led the baby to kick more often, that would not be reinforcement.

WHAT DOES REINFORCEMENT CHANGE?

Reinforcement increases the probability of a class of activities. Careful measurement would show that no two kicks by the baby are exactly the same, yet all are effective in getting the mobile to move. Consequently, reinforcement does not simply increase the probability of particular movements, but instead increases the probability of many movements that are effective in producing the reinforcer. These many forms of behavior are called members or instances of an operant.

DIFFERENT CATEGORIES OF REINFORCEMENT

Effective reinforcers can be divided into two classes: natural and arbitrary. *Natural reinforcers* are consequences that occur without anyone's intervention. For example, when one pushes a door, it opens to allow passage. Pushing, therefore, may be reinforced by the door's opening. Natural reinforcement, therefore,

plays an important role in our learning to deal with the physical environment. There is even evidence that it plays a role in learning to perceive our world. When we direct our gaze and focus, a part of the world is clearer to us, a result that may well reinforce the behavior of looking and seeing. Arbitrary reinforcers are those arranged by another person. For example, giving your dog praise each time it sits is an instance of arbitrary reinforcement. Both types have the same effect, to make the behavior that they follow more likely in the future.

Reinforcers can be divided another way into two categories: positive and negative. *Positive reinforcers* are those like the ones described so far. They are outcomes, or stimuli, that occur after some action. *Negative reinforcers* are things that are removed (or subtracted) from the situation as a consequence of some activity. For example, one can reduce the intensity of a loud noise (e.g., nearby jet engine) by placing one's hands over one's ears, or by going inside a building and shutting the door. In either case, the behavior removes or diminishes some stimulus, and that consequence makes the behavior more likely in that situation in the future. Stimuli that are effective as negative reinforcers are called *aversive stimuli.*

OTHER THINGS REINFORCEMENT CAN DO

The power of the concept of reinforcement is illustrated by other phenomena that can be produced once reinforcement has been observed. For example, operant behavior can be brought under *stimulus control*. If the baby's kicking results in movement of the mobile when a bright light is on but not when it is off, kicking soon will occur predominantly while the light is on, and rarely or not at all when it is off. That result tells us that the baby can "tell the difference" between bright light and its absence, and the child is said to *discriminate* between the two situations. After such learning, we could present the child with other intensities of light, and a likely result is that the more similar the new lights are to the original one, the more the baby will shake its leg. Engaging in a formerly reinforced activity in the presence of stimuli other than the one present during original learning is called *stimulus generalization*.

Another important set of phenomena arises when reinforcement is intermittent, that is, when not every instance of the action results in reinforcement. Instead, for example, maybe only one in every five instances, on average, might result in reinforcement. Two outcomes are likely if this happens. One, the action will occur with a much higher frequency than if every instance was followed by reinforcement. Two, if extinction is arranged (i.e., presentation of the reinforcer is discontinued), the response will continue to be emitted for many more times and a much longer period than it would have if every response had been reinforced. That is, persistence will have been enhanced. Procedures like the one just described, which determine the vigor of behavior, its organization across time, and its persistence, have been widely studied under the rubric of *schedules of reinforcement*.

HOW REINFORCEMENT AND LANGUAGE INTERACT

In the case of human behavior, the influence of consequences of behavior becomes more complicated once language has developed. Humans learn to behave in response to words, phrases, and sentences, including those they produce themselves and those that they say silently (or think) to themselves. How this relationship between behavior and words comes into being is not understood, but there is good reason to believe that operant conditioning plays a role in its development. Once language has developed, a human in a new situation in which, say, pushing a button results in receiving a candy bar, most likely will increase her probability of pressing the button. Although that appears to be a straightforward case of operant conditioning, it is likely not that simple. The human may well have "figured it out," that is, thought, "Oh, I see, if I press this button, I get my favorite candy bar." Her behavior, then, would be, in part at least, under the influence of what she said to herself, as well as the relation between the button press and the candy bar. Just as we would not say that her behavior was a simple instance of operant conditioning if someone else told her, "Press the button to get candy," we should not consider the situation in which she told herself what to do a case of clear-cut operant conditioning. Instead, it is an example of stimulus control of behavior by words, stimulus control that may have had its origin in operant conditioning.

—Marc N. Branch

See also Classical Conditioning; Extinction; Skinner, B. F.; Theories of Development

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OPPOSITIONAL DEFIANT DISORDER (ODD)

As children and adolescents learn to interact within their social environment, transient oppositional and defiant behaviors are common. However, about 2% to 16% of children and adolescents display a persistent, developmentally inappropriate pattern of oppositional and defiant behavior that interferes with family, social, or academic functioning. These children and adolescents are frequently referred for professional help and are often diagnosed with oppositional defiant disorder (ODD). ODD is characterized by the presence of several of the following disruptive behavior patterns: temper outbursts; frequent arguments with adults or authority figures; active refusal of requests, instructions, or rules; vigorous attempts to annoy others; blaming others for one's own mistakes or misbehavior; becoming easily annoyed by others; becoming easily angered or resentful; and patterns of spiteful or malicious behavior. The onset of ODD can begin at any time during childhood or adolescence, but most typically some degree of persistent oppositional and defiant behavior is evident by the time the child is 6 to 8 years old. In prepubertal children, ODD is about twice as common in boys as in girls, but after puberty, the incidence of ODD is the same for both genders.

Determining whether a child meets criteria for a diagnosis of ODD is not always an easy or straightforward task. ODD shares considerable overlap with other disruptive behavior disorders, including conduct disorder (CD) and attention deficit hyperactivity disorder (ADHD). In addition, mood disorders (e.g., dysthymia, major depression) and anxiety disorders are not uncommon among children and adolescents diagnosed with ODD. Although each of these disorders shares characteristics similar to ODD, they also have different implications for treatment. This complex web of overlap and comorbidity often makes differential diagnosis and treatment selection a complicated, yet essential task.

Although the exact cause and maintenance of ODD are unknown, it is generally believed that it results from a complex combination of genetic factors, temperament, family structure and interaction, stressors in the child's environment, and the child's learning history. A few of the factors that have been linked to the development of ODD include temperamental difficulties early in infancy, social skills deficits, parental psychiatric difficulties, parenting skills deficits, lack of family cohesion, family conflict, overemployment and underemployment of primary caregivers, and marital discord.

Given the array of factors implicated in the development and maintenance of ODD, along with the complexity of the disorder itself, it should not be surprising that effective treatment typically involves an individualized approach that encompasses a variety of treatment modalities and techniques. In addition, co-occurring difficulties (e.g., depression, anxiety) and caregiver difficulties (e.g., psychopathology, marital difficulties, parenting skills deficits) should also be addressed. In fact, most experts in the field believe that effective treatment should focus not only on the child or adolescent but also on the dynamics of the family and the parenting strategies employed by the primary caregivers. A few of the treatment approaches commonly combined to effectively treat ODD include cognitive-behavioral therapy, social skills training, communication training, marital therapy, family therapy, and in some cases pharmacotherapy. Using a combined treatment approach, the primary goal of therapy is to strengthen more appropriate behaviors in both the child and caregivers while decreasing less adaptive and less appropriate behaviors that are contributing to or causing family and child difficulties. Although the length and intensity of treatment will vary from child to child, treatment typically involves a period of regular sessions with the caregivers and the child, practice of therapeutic techniques outside of the treatment sessions, monitoring of treatment progress, and long-term maintenance with periodic "booster" sessions.

The last 10 years of research and practice have shown encouraging results in the understanding and treatment of children and families who must deal with disruptive behavior problems. However, there is still

much work that needs to be done if we are ultimately to understand the complexities of ODD.

—Michael B. Himle

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ORPHANS

A proportion of young adults die "before their time" in all societies—from accidents, conflict, diseases or other calamities—producing orphans. In "normal" circumstances, orphans are estimated to constitute between 1% and 5% of the total child population, depending on societies at different stages of development. These children have usually been cared for and fostered into the extended family. However, the ratios of orphan to nonorphan children have not been steady throughout time and place. Periodic disasters of various kinds (e.g., violence and certain diseases) have caused much greater mortality among young adults than among the rest of the population, leading to a peak in the number of orphans—often to disastrous proportions with terrible consequences for the welfare and development of individuals and societies. Such a disaster is presently upon us.

There is more than one definition of an orphan. In many settings, orphans have been defined as children younger than 18 years who have lost both parents. However, more recently, and especially in Africa, orphans are defined as children younger than 18 (or in some settings, younger than 15) years who have lost one or both parents. Paternal orphans (the father having died) have different vulnerabilities than maternal orphans (the mother having died). Both types of children are vulnerable, although perhaps not as much as are double orphans (both parents having died). Each category of orphans requires special attention. Not to be forgotten are also "orphans in the making"—children who are living with, and often caring for, parents dying from acquired immune deficiency syndrome (AIDS).

Since the end of the 1980s, many countries in sub-Saharan Africa have witnessed an alarming rise in the proportion of orphans. Some of this increase is due to civil war and other violence, but increasingly it is due to AIDS. By all accounts, Asia, and especially India and China, is on the verge of an AIDS pandemic that would make the situation in Africa pale by comparison—one consequence of which would be a burgeoning of the proportion of orphans in those countries, which are already faced with millions of destitute children, a great number of whom are living on the street. One in every five children in at least a dozen sub-Saharan African countries is now an orphan, with more countries being added to that list. If these children are not cared for and socialized, the development and national and international security implications will be significant, not to mention the considerable individual and societal psychological and social impacts.

The situation of orphans and other vulnerable children (OVC)—and many nonorphans are also extremely vulnerable—in sub-Saharan Africa is one of the major human, public health, and development issues of the early part of the 21st century, calling for immediate and massive attention. Orphanages are frequently seen as the appropriate solution to such massive numbers of orphans. Some orphanages, depending on how they are structured and for how long an orphan lives there, can mean the difference between the development of a child into a healthy and productive adult and that of a child with few prospects for the future. However, the literature is overwhelming in its evaluation that orphanages should constitute the last possible choice. And some, such as Human Rights Watch, have even shown orphanages in a number of countries to brutalize children. Before discussing the situation in sub-Saharan Africa, it may be worth mentioning a historical event in the United States in the 19th century, which was an innovative attempt to solve the "orphans issue" and at the same time to empty orphanages. This was the phenomenon of the "orphan trains."

ORPHAN TRAINS AND THE DEVELOPMENT OF THE UNITED STATES

The second half of the 19th century saw a tremendous surge in immigration into the United States, with a large proportion of immigrants arriving in New York City. There, the working and living conditions for immigrants were anything but salubrious, and their mortality rate was much higher than for the rest of the populations, causing the growth of orphans who often ended up on the street. Orphanages, such as the Children's Aid Society of New York, the New York Juvenile Asylum, and the New York Foundling Hospital, were set up to care for these children, but their capacities came far short of the need. Thus, it was felt something else was needed to rid New York of the street children from "the dangerous classes."

One solution was to send the children by train to the relatively scarcely populated Midwest—to Missouri and Illinois, for example—where they would be adopted (or at least included in the households) of farming families. The Methodist Minister Charles Loring Brace, who had founded the Children's Aid Society of New York in 1853, was one of the leaders of the process of shipping children by train to the Midwest. Advertisements were posted in Midwestern towns, especially through the churches, asking families to sign up for children who would be shipped by train from New York.

It is clear that orphans from New York and other Eastern U.S. cities were active and significant contributors to the growth and improvement of the farming communities in the Midwest. The phenomenon of the orphan trains lasted for some 75 years, with the first orphan train going to Dowagiak, Michigan, in 1854 and the last one to Trenton, Missouri, in 1929, with an estimated 150,000 to 400,000 children relocated, about 100,000 to Missouri. Many of these children were genuinely taken in by the farm families and adopted and treated as their own children; for others, the situation may have been closer to being a servant or field hand who received lodging and food; and in a few cases, there was direct abuse. On balance, it seems the orphans mostly benefited from this social experiment.

Orphans in Sub-Saharan Africa

A great number of publications have documented the situation of orphans in sub-Saharan Africa, including the various versions of *Children on the Brink,* the latest of which has indicated that there are now 130 million orphans in Asia and in sub-Saharan Africa. Two thirds of these children are in Asia, which has a total population five times that of sub-Saharan Africa. Of the 44 million orphans in sub-Saharan Africa, about 14 million are orphans because of AIDS. This proportion, however, is estimated to quickly change, with close to 70% of all orphans in 20 or so sub-Saharan African countries projected to be orphaned because of AIDS by 2010, when the total number of orphans as a result of AIDS will number more than 40 million current trends continue.

In 2000, more than 20% of all children in 13 sub-Saharan countries were orphans, with as many as 36% of Botswanan children being orphans (UNICEF). Even in Uganda, which is considered a success story in terms of reducing an adult AIDS prevalence rate of close to 20% down to what UNAIDS estimates to be 5%, the ratio of orphans to nonorphans will continue to be 20% of all children (or more than 2 million children) for at least a decade, as the wave of death follows by many years the wave of infection, and the wave of orphanhood lasts for many years beyond the wave of death.

When young adults die, not only their orphans, but also their parents, the children's grandparents who had counted on support from their children in old age, are destitute. Many of the grandparents, especially the grandmothers, end up caring for their grandchildren. According to UNICEF, for example, 44% of orphans were cared for by their grandparents in Namibia in 1992, whereas in 2000, 61% of the orphans were cared for by their grandparents. Namibia's situation is not unique. In addition to grandparents, the widowed mother is taking care of the major proportion of paternal orphans. In countries where the husband provided the family's economic stability, this means poverty and malnutrition, a situation that is worsened for some 20% or more of the widow-headed households who suffer the indignities of property grabbing by the deceased husband's relatives.

The crisis situation of orphans throughout sub-Saharan Africa is stretching the capabilities of the extended family-kinship system, which in Africa has always been there to care for children of deceased relatives. Indeed, fosterage has always been a fact of African life, even, in some cases, when parents were alive. Although the extended family has always stepped in, and is doing so now, the numbers are now

so large, and rising, that unless households and communities caring for orphans get assistance, they will not be able to cope. The current extended family and kinship caretaking system will likely collapse, with dire consequences for the orphan children themselves, for their households and communities, and for the future development and political stability of countries.

In many instances, the signs of collapse are already visible, with the destitution of children taken care of by a poor grandmother, and also with the growing phenomenon of second-generation orphans who are left when that grandmother dies. What do the children do then? Who will be there to care for them? Increasingly, we see child-headed households—households in which children, sometimes as young as 10 years old, take care of their siblings.

The potential effects on societies, if households are not assisted to a much greater extent than is currently the case, range from growing numbers of street children to social instability, from the threat of an undereducated generation to the sexual, economic, and humanitarian exploitation of children, all against a backdrop of mounting and formidable microeconomic pressures. Assistance is being provided by African governments, by international and local nongovernmental agencies, and by bilateral and multilateral agencies. The development of much of sub-Saharan Africa will depend on whether this assistance is sufficient and appropriately used.

—H. Kristian Heggenhougen

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OSTEOARTHRITIS

Osteoarthritis (OA) is the most prevalent form of arthritis. Moderate to severe OA affects more than 12% of the adults between the ages of 25 and 74 years. Symptomatic OA affects roughly 6% of the adult population, 10% of people older than 65 years. Age, female gender, and obesity are key risk factors for OA. Clinically, people with OA display increased joint pain, stiffness, decreased function, joint instability, muscle weakness, and fatigue. Pain worsens with use of the affected joint and is alleviated with rest. Morning stiffness lasting less than 30 minutes is common. In advanced stages of arthritis, most patients show profound structural articular changes. These structural changes, accompanied by comorbidities and age-related regression in physical conditioning often leads to further impairment and disability, making OA a major source of disability among older adults.

The goals for managing arthritis are reduction of pain, reduction of disability, and improvement of quality of life. Analgesics and nonsteroid anti-inflammatory medications (NSAIDs) are the most commonly used medications, yet they provide only partial relief. The use of NSAIDs increases the risk for major gastrointestinal complications (i.e., ulcers, bleeding, perforations), and cyclooxygenase-2 inhibitors, which minimize gastric distress, increase risk for cardiovascular events. Thus, for many arthritis patients, pain, disability, and reduced quality of life persist. There is clearly a need to develop new approaches to enhance the effectiveness of therapeutic strategies.

Behavioral health interventions in arthritis include patient education and exercise as complements to medication. Results with these interventions vary across individuals. Current recommendations for an average of 30 minutes of moderate physical activity each day provide a feasible and effective guideline for people with OA. Many of the factors associated with disability

in arthritis can be alleviated to some extent with exercise including muscle strength, range of motion, and cardiovascular fitness. Regular exercise can also affect psychological status. Higher positive affect and self-efficacy expectations have been reported following exercise programs.

On the horizon are psychosocial interventions with an emphasis on emotional regulation. These approaches focus directly on the quality of the emotional life of the patient and introduce methods through which the patient is better able to regulate their emotional state. Mindful meditation, for example, has been used with increasing frequency in pain management. In this approach, the emphasis is placed on acceptance and "letting go" of suffering associated with pain and other stressors, thus reducing the emotional burden of the illness. More sophisticated emotion-regulation models address the preservation and enhancement of positive states and the value of emotion complexity rather than simply dampening negative emotions and catastrophic thinking that accompanies chronic pain conditions.

The biomedical model views OA as the consequence of a lifetime of mechanical use and abuse that causes joint damage, physiological dysfunction, and impairment. However, this model cannot explain the low correlation between radiographic evidence of joint damage due to OA and functional impairment and pain. A biopsychosocial model for arthritis takes a broader view of pain and disability, stating that people's "pain behavior" is a product of their beliefs, understandings, experiences, and emotions, which may be modulated by their social environment. Consequently, this model views arthritis as the result of complex interactions among joint damage, muscle dysfunction, obesity, pain, emotion regulation, personality, social support, and economic resources. Targeting these characteristics in the design of better psychosocial interventions could result in better health outcomes for patients with OA and other chronic diseases.

—Isidro Villanueva and Alex J. Zautra

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OSTEOPOROSIS

Osteoporosis is a condition characterized by thinning of the bone and increased risk for bone fractures. It is most often encountered in elderly women, although it is also seen in men and younger people who have diseases or take medication that lead to bone loss. Osteoporosis affects more than 10 million individuals in the United States, although only less than 20% are diagnosed or treated. It is responsible for more than 1.5 million fractures a year in the United States alone, with an estimated direct health care expenditure (hospital and nursing homes) for osteoporosis and related fractures of $18 billion per year. Osteoporosis is more common in women because women have lower peak bone mass (amount of bone that is formed in childhood and adolescence), lose bone rapidly after menopause, and live longer. A white woman has a 40% chance, and a white man a 14% chance, of sustaining an osteoporotic fracture. The risk for developing osteoporosis and having bone fractures is genetically and racially determined—with the disease being more common in African Americans than in Asians and whites. The other strong predictors of future fractures are personal or family history of osteoporotic fractures, low body weight (less than 125 lb), and smoking.

Although any bone will fracture given sufficient force (such as motor vehicle crashes, which cause bone fractures even in healthy young people with strong bones), the osteoporotic bone will break with very little trauma, such as falling from standing height, and in severe cases even with no trauma, while just walking. There is a general increase in fragility in osteoporosis, and any bone may break as a result of decreased bone strength. However, typical osteoporotic

fractures are those of the spine, hip, and wrist, the areas of the body that tend to receive the greatest impact during the most common types of falls. Wrist fractures occur most often in women between 45 and 65 years of age and do so because women of this age tend to fall on outstretched arm with the wrist absorbing most of the fall impact. Wrist fractures usually heal well with no long-term consequences. However, they are often the first indication of fragility and herald future, more significant fractures. As such, they should prompt evaluation for osteoporosis.

Hip fractures occur in frail elderly people, usually after the age of 65 to 70 years. This is because elderly people, owing to change in balance and posture that occurs with aging, tend to fall backward and to the side, with the impact of the fracture received by the hip. Hip fractures are associated with 25% increase in mortality in the first year following the fracture, usually from complications of surgery or other medical problems that are primarily related to older age and poor health status of patients who suffer these fractures. Among those who survive the hip fracture and surgery, almost all have decreased functional status, and half need long-term nursing home care.

Vertebral (spine) fractures progressively increase in frequency after age 50 and often occur with no trauma at all in the course of simple daily activities such as lifting a grocery bag or coughing. They are often not noticed by the patient and are discovered during an x-ray examination. Multiple vertebral fractures, however, are a significant medical problem—they cause kyphosis ("dowager's hump"), which reduces the size of the chest cavity and interferes with normal lung function; reduction of the abdominal cavity causes early satiety and difficulty eating because there is not enough room for the stomach to expand during meals. Finally, vertebral fractures are a strong predictor of future vertebral and other fractures and should be taken as sign of osteoporosis and prompt evaluation and treatment.

Because the osteoporotic bone feels no different from normal bone, osteoporosis is silent until fracture occurs. To prevent the dire consequences of osteoporotic fractures, it is necessary to detect the disease before fractures occur. Osteoporosis is diagnosed by measuring bone mineral density (BMD), primarily at the hip and spine. The results are expressed as a T score (the number of standard deviations above or below the young adult mean value of BMD). The risk for fracture approximately doubles for each 1 unit decrease in T score. Osteoporosis is defined as a T score of –2.5 and below. Many fractures, however, occur in people whose BMD is above osteoporotic range, whereas some patients with low BMD do not suffer fractures. This indicates that BMD is not an absolute predictor of fragility and therefore should be only one factor in deciding who should be treated for osteoporosis. The other important factors are previous fractures (particularly vertebral fractures) and older age, which indicate increased fragility that is not captured by the BMD measurement.

Treatment involves adequate calcium (1,500 milligrams per day in food or supplements) and vitamin D intake (400–800 international units of vitamin D per day) in all patients with the disease or at risk for developing it, including postmenopausal women, those receiving long-term steroid therapy, and all elderly people. In addition, weight-bearing exercise is important because it decreases bone loss and improves muscle strength, which decrease risk for falling. In people at high risk for fractures, specific medications for osteoporosis should also be used, which can decrease the fracture risk by 30% to 60%. Several effective medications are available, and many more are being developed or are being tested in clinical trials. With increase in awareness of osteoporosis and availability of effective therapies, it is possible that osteoporotic fractures, once considered an inevitable consequence of aging, will be largely prevented.

—Tamara Vokes

See also Gerontology

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OVULATION

Ovulation is the process by which a female reproductive cell, the ovum (plural, *ova*), is released from the ovary into the oviduct for fertilization by the male reproductive cell (sperm). In women, an ovum is released cyclically, about every 28 days, from puberty until menopause. If the ovum is fertilized, pregnancy ensues, and hormonal signals from the embryo block subsequent ovulations for the duration of pregnancy. Without fertilization, the ovum is sloughed out of the body along with the lining of the uterus during the next menstruation. The ovulatory process is tightly regulated by a hormonal signaling network between the brain and the ovaries.

At birth, the ovaries house more than 500,000 ova, each encased in an individual compartment called a *follicle*. About the time of puberty, the hypothalamus (a region in the brain) begins sending a hormonal signal called *gonadotropin-releasing hormone* to a second, specialized brain region, the pituitary. The pituitary responds to the gonadotropin signal by synthesizing *follicle-stimulating hormone* (FSH), which is carried in the bloodstream to the ovary, where it stimulates the growth of several small follicles. Most of these follicles typically die off after their initial growth response, leaving a single dominant follicle to progress toward ovulation. Normally, only one ovum is released during ovulation with each cycle. In the relatively unusual case that more than one follicle continues to develop, several ova may be released, and multiple births (i.e., fraternal twins, triplets, etc.) may result. This more commonly occurs in women receiving fertility drug treatments.

Specific changes in the dominant follicle and its immediate surroundings occur in preparation for ovulation. Under the influence of FSH, the follicle balloons, becoming a large, fluid-filled structure in which the ovum is nested. Cells lining the interior wall of the follicle (granulosa cells) begin secreting large amounts of the potent steroid hormone *estrogen.* When the concentration of circulating estrogen reaches a critical threshold, the pituitary releases a surge of *luteinizing hormone* (LH). This surge of LH triggers the series of dramatic, carefully regulated events that lead up to ovulation. Granulosa cells are induced by LH to synthesize prostaglandins, a family of hormones that increase the volume of blood flow to the ovary and to the dominant follicle. LH also initiates the production of *progesterone* by the follicle; this steroid hormone induces the enzymes that break down the collagen scaffolding that supports the cells of the follicle wall. The degradation of this scaffold matrix causes the follicle wall to weaken and eventually rupture, releasing the ovum from the ovary for its migration into the oviduct.

After ovulation, the ruptured follicle changes in shape and function to form a *corpus luteum* (yellow body), the main function of which is the production of progesterone. Some of this progesterone is carried by the circulation to the uterus, where it stimulates the uterine lining to thicken and develop in preparation of pregnancy. In the case of conception, the fertilized ovum sends a signal (*human chorionic gonadotropin* [hCG], the pregnancy marker detected by most home pregnancy tests) to the corpus luteum to sustain the production of progesterone. Without the hCG signal, the corpus luteum begins to degenerate 14 days after ovulation, and levels of circulating progesterone concomitantly decrease. The loss of this inductive stimulus causes the lining of the uterus to deteriorate and break away from the uterine wall, and during the next menstruation, the lining is sloughed out of the body. The drop in progesterone is also detected in the brain by the hypothalamus, which responds by producing the gonadotropin-releasing hormone that causes the release of FSH by the pituitary, leading to the next wave of follicular growth, and thus the ovulatory cycle begins again.

The process of ovulatory rupture and subsequent repair of ovarian tissue has been likened to the formation and healing of a wound on the surface of the ovary. In fact, researchers have demonstrated that cells on the surface of the ovary incur damage to their DNA with every ovulation that is typically rectified by inherent cellular repair mechanisms. DNA damage that escapes detection may lead to genetic mutations and the transformation of the ovarian cell into a cancerous cell. Epidemiologic studies have linked the risk for ovarian cancer development to the number of lifetime ovulations; circumstances that overt ovulation (e.g., pregnancy, oral contraceptive use) appear to have protective benefits against ovarian cancer.

—Anna C. McDonnel and Thomas E. Curry, Jr.

See also Menopause

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P

Phobias

You gain strength, courage and confidence by every experience in which you really stop to look fear in the face. You are able to say to yourself, "I have lived through this horror. I can take the next thing that comes along." You must do the thing you think you cannot do.

—Eleanor Roosevelt

PAIN

Pain affects more than 50 million Americans yearly, accounting for more than 80% of all visits to physicians and costing more than $70 billion annually in health care and lost productivity. Life without pain would be difficult. Pain serves as a warning device to signal potential tissue damage. It serves a recuperative function that promotes healing. Pain provides low-level feedback about the functioning of our bodily systems. We use this pain to make minor adjustments, such as shifting body weight when sitting long periods. Pain is the symptom that is most likely to lead us to seek treatment. The International Association for the Study of Pain defines pain as an unpleasant experience associated with actual or potential tissue damage to a person's body. The degree to which pain is felt depends on how it is interpreted, and how it is interpreted is influenced by the context in which it is experienced.

Pain is defined as acute or chronic. Acute pain lasts for 6 months or less and results from a specific injury that produces tissue damage. Typically, it disappears when the tissue damage is repaired. Chronic pain is defined by the International Association for the Study of Pain as pain without apparent biological value that has persisted beyond the normal tissue healing time. It occurs in 10.1% to 55.2% of the population. Although it typically begins with an acute episode, it does not decrease with treatment and the passage of time.

Theories of pain must define how we sense pain, or the physical components of the delivery of pain, and how we perceive pain, or how we interpret the sensations our bodies receive. The earliest theories of pain argued that pain is due to nerve impulses produced by an injury and transmitted directly to a pain center in the brain. This specificity model proposed specific sensory receptors responsible for the transmission of different types of sensations. Pain, in this model, is proportional to the extent of the injury. Other theorists argued for a pattern theory of pain, whereby pain sensations result from the transmission of patterns of stimulation at the peripheral nerve endings. The gate theory, developed by Ronald Melzak, a Canadian psychologist, and Patrick Wall, a British neuroscientist,

integrates both specificity and pattern theory and begins to explain the importance of psychological factors in the pain experience. Melzak and Wall argue for an attention mechanism whereby nerve impulses are influenced in the spinal cord by other nerve cells that act like gates, either preventing the impulses from getting through or facilitating their passage to the brain.

One manner in which the brain controls pain is through endogenous opioids—narcotic-like substances produced within the body. Wall argues that the brain's involvement is more complex than simply the production of endogenous opioids; rather, pain is a sequence of events that begins when an injury generates an announcement of its presence in the sensory nerves, followed by the attention mechanism selecting the incoming message as worthy of entry, and finally, the brain generating the sensation of pain. Classic theory argues that the brain analyzes the sensory input to determine what has happened and presents the answer as a pure sensation. Wall, on the other hand, proposes that the brain analyzes the input in terms of what action is appropriate. When any of the three components is missing—sensation, attention, or motor planning—pain does not occur.

Psychologist Dennis C. Turk focuses on a cognitive-behavioral model that incorporates anticipation, avoidance, and reinforcement. The critical factor for the cognitive-behavioral model is that people learn to predict events and to respond with appropriate reactions. People with pain have negative expectations about their ability to control certain motor skills, such as walking or bending, without pain and tend to believe they have limited ability to exert any control over their pain.

Treatment of pain is varied and often multimodal. Pharmacological control is the first line of defense. The American Pain Society indicates that it is possible to manage pain adequately in patients, including substance abusers, with life-threatening illness and to do so safely and responsibly using narcotics. Surgical treatment involves cutting the pain fibers at various points in the body, so that pain sensations no longer can be conducted. The effects are often short-lived and may worsen the pain because the treatment damages the nervous system.

Some treatments focus on sensory control of pain. One of the oldest known techniques of pain control is counterirritation, whereby pain is inhibited in one part of the body by stimulating another area. Another sensory control method is the use of exercise. Although at one time it was felt that the less activity, the better, current treatment philosophy emphasizes exercise. A third method of sensory control is acupuncture. In acupuncture treatment, long, thin needles are inserted into points on the body thought to influence areas in which a patient is experiencing pain. It is effective against some forms of pain, both chronic and acute. However, it exacerbates other forms of pain, again both chronic and acute.

Numerous treatments emphasize patient control of pain. One, biofeedback, comprises a wide variety of techniques that provide biophysiological feedback about bodily processes. Another method of patient control is relaxation. Teaching patients relaxation techniques helps them deal more effectively with stress and anxiety, which may indirectly reduce pain. Relaxation also may affect pain directly by relaxing muscles or diverting blood flow. A third method of patient control is hypnosis. Although the exact mechanism by which it works is not clear, hypnosis is effective for the management of some types of acute pain. A fourth method is distraction, which involves turning one's attention away from pain by focusing on other things or by engaging in vigorous activity. Although useful for low-level acute pain, patients with chronic pain cannot distract themselves indefinitely. Finally, guided imagery, in which patients conjure up a picture that they hold in their mind during the painful experience, has been used to control some acute pain and discomfort.

When all other treatments fail for patients with chronic pain, pain management programs may be used. These are interdisciplinary programs, bringing together all that is known about pain control. Patients are carefully evaluated with respect to their pain and pain behaviors. This is followed by an individualized treatment plan based on the profile of the patient's pain and how it has affected his or her life. Pain management programs include several common features, such as patient education about the nature of their illness, training in measures to reduce pain, and group therapy to help patients gain control of their emotional responses. Many programs include family therapy that focuses on the inadvertent reinforcement of pain behaviors by the family. Finally, relapse prevention is an important component to these programs. Studies indicate that these interventions reduce reports of pain disability and psychological distress.

The pain associated with some terminal illnesses is reported by many patients as the most feared component

of the illness. For these patients, palliative care is appropriate. Palliative care is similar to hospice care but continues supportive measures such as blood transfusions and tube feedings. Palliative care is more appropriate than hospice care for children. In addition, palliative care is appropriate for children with a wide range of conditions, even when a cure remains a possibility. Bruce Himelstein and colleagues have outlined four types of conditions for which pediatric palliative care is appropriate. The first type includes conditions for which curative treatment is possible but may fail, such as, advanced or progressive cancer. The second includes conditions requiring intensive long-term treatment aimed at maintaining the quality of life, such as human immunodeficiency virus infection. The next type includes progressive conditions in which treatment is exclusively palliative after diagnosis, such as progressive metabolic disorders. Finally, the fourth includes conditions involving severe, non-progressive disability, causing extreme vulnerability to health complications, such as severe cerebral palsy with recurrent infection.

Himelstein and colleagues also address the five essential elements of pediatric palliative care. In the physical dimension, the primary objective is to identify the patient's pain or other symptoms. In the psychosocial dimension, the objectives focus on identifying the fears and concerns of the both the child and the family, understanding what the child knows about death and how he or she copes with such issues, and identifying resources to help in the grieving process. The spiritual dimension involves performing an assessment of the child's hopes, dreams, and values. The Advance Care Planning–Illness Trajectory dimension helps the family decision makers clarify goals for the child's care and addresses the concerns of the family as the end of the child's life nears. Finally, the dimension of practical concerns deals with issues of coordination of the health care team, preferences for location of care, the child's functional status, and financial issues associated with the child's illness.

Our knowledge of pain and effective treatment of it are limited. Research in recent years has expanded our understanding of the dynamics of pain and has helped us focus on methods to treat or alleviate its effects. Future research should broaden our knowledge of this area.

—Virginia Norris

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PALLIATIVE CARE

Since its introduction into medical practice during the 1960s and 1970s in the United States, the United Kingdom, and Canada, palliative care has been defined and practiced in various, and often differing, ways. At its inception, it focused on relief of suffering and care of the adult patient dying from incurable cancer. Over time, the definition and practice have come to focus on improving quality of life and alleviating suffering for both pediatric and adult patients within a wider diagnostic spectrum.

Broadly construed, palliative care refers to care that seeks to prevent, ease, or reduce symptoms without curing the underlying disease or disorder. In this sense, palliative care is not restricted to dying patients or to patients enrolled in hospice programs. Following

this general definition, the 1997 Institute of Medicine (IOM) report on improving care at the end of life cites palliative care as an important adjunct to life-prolonging therapies as well as to those who live with chronic illnesses, chronic pain, or other symptoms. The National Hospice and Palliative Care Organization extended this definition in 2003 to include the management of distressing symptoms, provision of respite, and care that begins at diagnosis and continues through death and bereavement.

In contrast are definitions of palliative care that are more restrictive. For example, the 1990 World Health Organization (WHO) definition is specific to care of patients whose disease cannot be cured. Other sources similarly describe palliative care as the management of patients with advanced and progressive disease.

Thus, there is lack of agreement among health care professionals about what palliative care is, who should receive it, when it begins, and when it ends. Indeed, the term is often used interchangeably with terms such as *supportive care*, *comfort care*, *hospice care*, and *end-of-life care*. Moreover, some health care professionals continue to associate palliative care with cancer and believe there is a clear line between the ending of cure-oriented care and the beginning of palliative care. In this view, palliative care requires that patients give up treatments aimed at cure, such as radiation or chemotherapy. Others believe the transition between cure and care is more gradual and less definitive. In this view, palliative care complements therapies aimed at curing disease or prolonging life. In addition, it can help patients and families navigate the changing goals of care in the face of progressive illness and the necessity of a wider range of palliative interventions to satisfy increasingly complex care needs. Over time, priority of care shifts away from cure and toward focus on the dying process. Emphasized are end-of-life decision making, care that supports physical comfort, and a death that is consistent with the values and expressed desires of the patient. In this model, the aim is symptom relief and comfort for patients, regardless of their place on the illness continuum.

Despite lack of consensus about the range of palliative care, there is general agreement about its goals. These include a total approach to care provided by an interdisciplinary team, focus on prevention and relief of suffering, and promotion of quality of life. Major concerns include pain and symptom management; giving patients and families the information needed to participate in decisions about care; advance care planning; psychosocial, spiritual, and practical support; coordination of care, including arranging for expert help and services in the community; and remaining sensitive to personal, cultural, and religious values, beliefs, and practices of patients and families.

Consideration of the palliative care needs of children (including both neonatal and pediatric care) has received heightened attention in recent years. Although preparing for a child's death is met with complex emotions by parents, experts believe that the implementation of palliative care strategies at the time of a life-threatening diagnosis can improve the care of those who survive and those who die. However, the 2002 IOM report highlights that children are unique in terms of anatomy, physiology, and psychosocial and cognitive development. As such, specific decisions about palliative care must be adapted to each child's level of development. Moreover, the child's status as a minor necessitates parent involvement in palliative care planning.

Meeting the goals of palliative care requires the coordinated involvement of multiple disciplines, although various settings may have different ways of organizing and staffing care teams. In addition to the attending physician, nurses and social workers are considered key members of an effective palliative care team. Teams may also include psychologists; chaplains; physical, occupational, or speech therapists; home health aides; a bereavement coordinator; trained volunteers; and child life specialists. The patient and his or her family, as well as any others involved in caring for the patient, are considered integral members of the care team as well as the focal point of the caring process.

The practice of palliative care varies widely throughout the United States. The most frequent sites for adult palliative care delivery include hospitals, nursing homes, home care as part of a hospice program, home care without hospice, and inpatient hospices. Some hospitals and nursing homes provide inpatient palliative care units, whereas others provide palliative care through consulting teams or through one or more designated individuals who may be called on for consultation or assistance with palliative care. However, according to the 1997 IOM report, many hospitals and nursing homes have neither an identifiable inpatient palliative care team, nor individual personnel with clearly designated palliative care expertise. Hospices are organizations specifically

intended for provision of palliative care to dying patients and those close to them. However, patients who have palliative care needs but who do not qualify for hospice care may be challenged in finding resources. Moreover, the availability of pediatric home hospice care is sparse, though rising.

Palliative care has become an area of special expertise within medicine, nursing, social work, pharmacy, chaplaincy, and other disciplines. The United Kingdom recognized palliative medicine as a medical specialty in 1987, followed by Australia, New Zealand, and Canada. An effort to win specialty recognition in the United States is under consideration. However, many agree that every health care professional that deals directly with seriously ill and dying patients and their families needs a basic grounding and demonstrated core competencies in palliative care. Fortunately, numerous professional societies (e.g., American Academy of Hospice and Palliative Medicine) and organizations (e.g., Last Acts Partnership, Initiative for Pediatric Palliative Care), journals (e.g., *Journal of Pain and Symptom Management*), meetings and conferences, academic centers (e.g., Duke University Institute on Care at the End of Life), and experts in palliative care continue to direct more attention to improved practice, research, and education in the field.

—Melanie J. Bonner, A. Bebe Guill, and Megan Brown

See also Death, Death with Dignity

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PANIC DISORDER

According to the current diagnostic definition, panic disorder is diagnosed when (1) there are recurrent unexpected panic attacks, and (2) at least one of the attacks is followed by persistent worry about future attacks, implications of an attack, and a change in behavior due to the attack (i.e., impaired interpersonal functioning). A panic attack is defined as a discrete event that involves intense fear and several physiological reactions such as palpitations, sweating, dizziness, shortness of breath (sometimes experienced as "a band around the chest"), trembling, numbness or tingling in the extremities, and nausea. In addition to these acute physiological reactions, panic attacks often include derealization (feeling that the world or situation is not real) or depersonalization (described as a detached feeling, or that one is outside oneself watching a movie). Finally, during a panic attack, individuals often report feeling that they might die or lose control (physically or mentally).

Panic disorder, characterized by panic attacks occurring regularly or a persistent fear of future panic attacks, has two subtypes. One subtype is panic disorder with agoraphobia (PDA). Individuals with PDA not only have a persistent fear of future panic attacks but also avoid different places or situations out of a concern that another attack may occur. In severe cases, the range of places and situations avoided is so extensive that the sufferer cannot leave the home. Some individuals with PDA may be able to go places when accompanied by someone they trust will successfully care for them should they have a panic attack in public. The other subtype is panic disorder without history of agoraphobia (PD). Sufferers of PD may be apprehensive of having a panic attack in public but do

not exhibit the widespread avoidance of public places, with the consequent limitations in mobility, typical of individuals with PDA. PDA and PD have equal prevalence rates of about 3.5%, according to the National Comorbidity Survey.

PREVALENCE AND ETIOLOGICAL FACTORS

Biological studies of the hereditability of panic disorder, either with or without agoraphobia, have not conclusively determined that the disorder is genetically transmitted. Instead, and consistent with models of other anxiety disorders, it has been suggested that a genetic vulnerability exists that potentiates the development of the disorder.

An important aspect of PD and PDA involves the differential gender distribution of the disorders. Although PD is generally higher in women than in men, the gender differences in PDA are striking. Estimates of the differences are as high as 5:1 ratio of females to males with PDA, and with women typically experiencing more severe symptoms. It is generally true for all anxiety disorders that there is a higher prevalence in women than in men, but this gender difference is even more pronounced in the case of PD and PDA.

One dominant model of the etiology of panic involves what has been termed the *false-suffocation alarm,* whereby the individual has an increased sensitivity to carbon dioxide in the environment. When there is an increase in carbon dioxide that would otherwise be undetectable to most individuals, the PD sufferer has an automatic alarm that alerts him or her to the possibility of suffocation. However, because other people in the same situation are both unaware and unaffected by the increased carbon dioxide, the panic sensation of feeling unable to catch one's breath and the associated anxiety appear uncued. Providing direct experimental evidence for the false-suffocation alarm model is complicated by the fact that increased carbon dioxide in the blood brings about physiological responses such as increases in respiratory and heart rates. Therefore, it is difficult to separate whether anxiety associated with a panic attack is due to an increased sensitivity to elevated levels of carbon dioxide in the blood or the misinterpretation of bodily symptoms (e.g., increased respiratory and heart rates).

The problem of misinterpretation of bodily symptoms leads to another major model used to explain panic disorder, namely the dispositional trait of *anxiety sensitivity*. This construct describes the propensity to attribute risk or potential harm to variations in bodily sensations. Someone with elevated anxiety sensitivity is considered at risk for PD or at least has a higher likelihood of experiencing panic attacks. The design of the Anxiety Sensitivity Index reflects the common concerns articulated by PD sufferers. Specifically, three factors have been identified from this measure: fear of cardiovascular symptoms, fear of publicly observable symptoms, and fear of loss of cognitive control. Taken in turn, fear of cardiovascular symptoms is observed in many PD sufferers, who sometimes seek reassurance that they are not having a heart attack by visiting the emergency room during a panic attack. The PD sufferer also dreads the shame and embarrassment of having a panic attack in public where others may witness him or her being overwhelmed and incapacitated. Finally, fear of loss of cognitive control is evident by the all too common complaint among PD sufferers that during a panic attack, they feel they will "go crazy" or lose their minds.

When considered in conjunction with the aforementioned false-suffocation fear hypothesis, anxiety sensitivity is a useful predictor of responses to biological challenge tests. One method is the hyperventilation challenge, in which an attempt is made to replicate panic sensations in the laboratory. It has been found that participants, who have no history of panic but have elevated anxiety sensitivity, tend to experience increased anxiety when instructed to hyperventilate.

TREATMENT OF PANIC DISORDER WITH OR WITHOUT AGORAPHOBIA

Despite the similarities between PD and PDA, treatment outcome for these disorders has been quite different. Treatment for PD alone is reliant on a combination of cognitive and behavioral therapy. Cognitive therapy for PD challenges the threat appraisals associated with physical sensations. These catastrophic misinterpretations of the body's feedback are considered central to the maintenance of PD according to cognitive theorists. Altering these misinterpretations leads, then, to decreases in panic severity.

Although the cognitive approach to therapy has gained prominence and has been proved effective, behavioral therapy is another important component of treatment for PD. Specifically, exposure to interoceptive

cues (anxiety-provoking bodily sensations) is necessary for the alleviation of panic symptoms. For example, if a PD sufferer were primarily concerned about heart palpitations, then interoceptive cue exposure would focus on increasing heart rate during the session as part of the exposure treatment. Carefully regulated exposure to the anxiety-provoking sensations results in decreased levels of anxiety elicited when exposed to the same internal cues, feelings of mastery, and an erosion of the confidence in catastrophic predictions based on physical sensations. For example, a panic sufferer may be asked to experience dizziness during a treatment session in order to gain mastery over a sensation commonly associated with panic attacks. A detailed discussion of interceptive cue exposure can be found in Barlow (2002). When this approach is used in conjunction with exposure for situations that are avoided, then the range of mobility is improved in PDA sufferers, although this is more difficult than in PD.

Although the outcome for both cognitive and behavioral interventions for PD has been generally favorable, outcome results in the treatment of PDA have been less positive. Cognitive behavioral therapy for PDA also focuses on challenging the catastrophic misinterpretations of interoceptive cues and providing exposure to these anxiety-producing bodily sensations. However, agoraphobia also requires exposure to situational cues that give rise to anxiety and the risk for panic attacks. The literature suggests that often PDA sufferers do not achieve the level of mobility that matches the outcome goal typically set by therapists. In treating individuals with PDA, it is often necessary to make home visits or extend the duration of sessions in order to ensure a complete return to baseline levels of anxiety during the exposure session. Furthermore, extensive homework assignments for continued exposure are essential to positive outcome for PDA. This includes activities designed to specifically increase mobility, with the same goal of increased mastery over both the environment and anxiety that is experienced in the face of possibly experiencing a panic attack.

—Dean McKay and Kevin McKiernan

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PARASUICIDE

Parasuicide describes any nonlethal, deliberate self-harm behavior. Linehan further divides parasuicide

into the categories of suicide attempts not completed with intent to die, ambivalent suicide attempts with unclear intent to die, and nonsuicidal self-injury. This definition is controversial, however, because some believe that deliberate self-harm behavior should only be considered parasuicide if there is no intent to die. The debate is complicated by the reality that it is often difficult to determine the intentions of people who engage in self-harm. Because of varying definitions of parasuicide and the diversity of locations in which it has been studied, lifetime prevalence rates vary widely from 1% to 6% of the population.

Parasuicidal behaviors range from the most frequently used method of self-poisoning by drug or alcohol overdose to using cutting or piercing instruments on oneself. Parasuicidal behaviors occasionally include methods that are typically more lethal, such as hanging, drowning, consuming potentially dangerous chemicals, jumping from high places, or using guns.

Generally, rates of parasuicidality appear to be higher for females than males. Among females, the highest rates are for 15- to 24-year-olds. Males are at the highest risk between the ages of 25 and 34 years. Racial-ethnic differences have been found among U.S. adolescents, with suicide attempts made by 10% of European American females, 10% of African American females, 8% of African American males, and 5% of European American males. There have not been any comparable studies done recently on adults in the United States. However, ethnic differences have been found in European studies, with young Asian women being at highest risk.

Parasuicidal behavior has been found to predict future parasuicidal behavior as well as completed suicides. As many as 50% of completed suicides have been preceded by parasuicidal behavior. Other generally agreed on risk factors for parasuicide include having a mental disorder (especially borderline personality disorder or depression), substance use, childhood sexual abuse, unemployment, having recently changed living situations, being single or divorced, being female, and being younger. Additional risk factors currently being studied include loneliness, deficits in problem solving, deficits in interpersonal relations and skills, comorbidity, and sexual orientation. A risk factor specific to the elderly is having an acute or chronic physical illness. Experiencing problems at school is an additional risk factor for adolescents. Factors thought to protect against parasuicidality are family closeness, social support, and possibly religiosity.

Treatment for individuals with parasuicidal behaviors should start with a comprehensive assessment of both current parasuicidal ideation and a history of parasuicidal behaviors using clinical interviews and relevant measures. In addition, known and potential risk factors should also be assessed. Assessment should lead to a determination of risk for additional parasuicidal behavior or suicide. Because of the heterogeneity among people who engage in parasuicidal behavior, there is no established treatment procedure to follow once initial assessment and case conceptualization have been completed. However, several interventions have received some empirical support: cognitive-behavioral problem-solving therapy, medication management with flupenthixol decanoate, home visitation to ensure treatment compliance, psychodynamic interpersonal therapy, and dialectical behavior therapy for people with borderline personality disorder. Additional research is needed to determine which treatments are most effective depending on the client's age, culture, and precipitating problems or diagnoses.

—Marc S. Karver and Nicole Caporino

See also Assisted Suicide, Cluster Suicide

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PARENT-CHILD INTERACTION

Throughout the life span, parent-child interaction is an important context for development. Bronfenbrenner's ecological approach to human development describes behavior as unfolding within a nested and interactive set of systems and levels ranging from several microsystems (family, peers, neighborhood) to the macrosystem (broad societal norms and attitudes). Although development clearly occurs within all of these multiple systems and contexts, the family context is one of the most proximal and often the most influential of these systems.

THEORETICAL OVERVIEW

Current research has focused our attention on the quality of parent-child interaction as a critical component in understanding cognitive and social-emotional pathways for children and youth. Parents' unique ways of responding to a child's fundamental needs—and the child's corresponding expectations—are evident in infancy, resulting in interaction patterns that remain generally stable throughout a child's journey into adulthood. Parent-child interaction style is determined by many factors, including parental and child characteristics and propensities, situational factors (such as social class and support systems), and cultural and societal norms.

Many theorists believe that the best way to understand the influence of parent-child interaction on development is to examine the child's development in the context of the parent's behavior. Beginning during infancy and continuing through toddlerhood, children develop the capacity for self-regulation and self-control, and they internalize the standards, rules, and expectations of their family situations. During this time, a child must learn to manage frustrations and excitement, delay gratification, and accept disappointment. With increasingly sophisticated motor skills, children are able to engage with their environments on their own and to negotiate early social relations. Understanding and responding to the views of others, coping with interpersonal tensions, and having the capacity to enjoy play partners are some of the challenging developmental tasks of early childhood.

Diverse theoretical frameworks address how children develop the aforementioned skills as they interact with their primary caregivers. Attachment theory, as well as other psychodynamic and psychosocial views, suggests that self-regulatory processes emerge as early as infancy from the parent-child system. These theories focus on the parent's responsiveness to the child—the degree to which the parent successfully interprets and responds to the child's cues. A parent who promptly picks up and soothes a crying baby or who stops a stimulating game when the child turns away would be described as responsive, synchronous, or attune to the child's cues. A parent who disrupts a child's appropriate attempts at play to assert his or her own agenda or who ignores (or misinterprets) a child in distress might be described as poorly attuned to the child's cues.

Through interactions with the parent, the child's view of self and the world is created. Consistent, responsive interactions with a primary caregiver help the child form a stable core of self-regulatory abilities. If parents provide a reassuring base from which the child can explore and engage the world, following the child's cues and remaining emotionally available yet respectful of the child's autonomy, the child will develop confidence to approach new tasks and resilience in the face of frustration. If a parent is unable to interpret the cues of the child or feels threatened by or responds punitively to the child's growing autonomy, a child's sense of self in relation to his or her world becomes unsure, because the child grows to believe that his or her efforts to communicate needs to the parent will fail. Thus, a child's self-confidence evolves from the confidence the child experienced in the early parent-child relationship. Feelings of security and predictability in the attachment relationship result in the child's self-reliance and the capacity to seek out relations with others who are caring. From this perspective, the parent-child interaction serves as a "working model" that influences interpersonal expectations, as well as affective and behavioral responses to future relationships.

Although parent-child interaction style is often discussed as a unidirectional variable—that is, going from parent to child—anyone who has spent time with children knows that children influence parents as well. For this reason, many researchers have discussed the notion of "goodness of fit," to describe the importance of a parent's ability to adjust his or her own behavior to the child's unique personality in predicting a child's positive outcomes. Although this sort of adjustment represents an aspect of parental responsiveness to the child's behavior, explicitly acknowledging the contribution of the child to the interaction is an important contribution of the goodness-of-fit literature.

The notion of "relationship schemas," derived from the social cognition literature, provides a similar perspective using different language. Cognitive schemas emerge through repeated experience with the primary relationship in a child's life. These "schemas" or "roadmaps" serve as guides to future relationships that can be activated automatically or unconsciously. In addition, relationship schemas include affective and motivational components. Thus, the parent-child interaction contributes to the development of internal roadmaps, which results in schema-consistent motives and behavioral routines. According to this view, a child will engage in behavioral responses and be motivated in ways that are consistent with existing habits of interacting informed by early parent-child interactions.

EMPIRICAL BACKGROUND

Much of research with young children and families has supported these theoretical views. Children who have early relationships marked by responsive and sensitive care tend to have greater attention control in preschool and do better academically, socially, and emotionally in elementary school than children whose interactions with primary caregivers are inconsistent, overstimulating, or punitive. Maternal sensitivity—being responsive in the ways discussed earlier—has consistently been documented as a strong predictor of positive developmental outcomes for young children. Specifically, young children with a history of secure attachment relationships with their parents have skills to become efficient learners and productive social individuals. Children reared by responsive parents are self-reliant in school, delay gratification, are curious, and manage stressful situations well. Similarly, in social situations, children with secure attachment histories function effectively and develop peer relationships characterized by emotional closeness, empathy, and positive affect.

Patterns of parent-child interaction remain influential through a child's progress toward adulthood. For example, during middle childhood, parent-child interaction style continues to influence the development of the child's self-system, including self-esteem and cognitive competence. As a child's freedom increases and more time is spent with peer groups, parental monitoring becomes a critical issue for both the parent and the child. Interactions characterized by warmth, responsiveness, and respect result in effective monitoring, which guides the child appropriately while accepting and appreciating his or her newly emerging skills and interests.

The quality of parent-child interaction continues to influence positive outcomes during adolescence, although relationships may be strained by increased differentiation between the parent and the emerging adult. As a result of the vast developmental changes that occur at this time, youth seek independence through a variety of venues in many different forms. For example, changes in cognitive functioning may support a "confrontational" style for many youth. Even so, warm and responsive parenting is associated with self-esteem, identity formation (e.g., making choices regarding career paths, sexuality, and religious identification), prosocial behavior, and effective parent-adolescent communication. Furthermore, adolescents who have interactions with parents that are responsive are less likely to be depressed or anxious or to experience a variety of behavior problems. As youth transition into the world of young adulthood with increasing demands and interests, patterns of parent-child interaction will become modified as issues of supervision, authority, and trust are negotiated.

The relevance of parent-child relationships in adulthood and later years has become increasingly more salient as demographic changes in mortality, morbidity, marriage, and fertility have altered the structure of the family in later life. Overall, aging parents continue to provide support to their offspring in ways that are influenced by different factors, including the birth of a grandchild, living distance between parent and child, and parental resources. Likewise, adult children who provide care for their aging parents are often confronted by unique issues of the "sandwich generation," caught between their

responsibilities to their parents and the demands of their young children and their careers. Although research in this particular area is limited, reports suggest that the quality of earlier parent-child interaction contributes to the ways parents and their adult children resolve the challenges during this time.

FACTORS INFLUENCING THE PARENT-CHILD INTERACTION

The ways in which the parent-child relationship changes over time reflect how the unique developmental challenges of various stages of life—for both parent and child—affect parent-child interaction style. Other variables that influence parent-child interaction style include stressors such as poverty, mental illness, and substance abuse. Mothers who are depressed, for example, are less responsive to their babies' cues. Very low-income parents have been documented to utter far fewer positive statements and far more negative statements to their children than middle-class parents—a characteristic that is most likely associated with the constraints of poverty but that nonetheless has an impact on the parent-child relationship. Parental education, which is commonly linked with socioeconomic class, also affects parenting behavior. Mothers with higher education are more sensitive to their children's cues as well as more engaged with them. Parenting patterns are also influenced by culture. Choices such as how parents care for infants, the degree to which parents encourage infant exploration, how nurturing and restrictive parents are, and which behaviors parents emphasize and value are determined by the familial cultural belief system.

—LaRue Allen, Jennifer Astuto, and Anita Sethi

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Zero to Three, for parents, http://www.zerotothree.org/ztt_parents.html

PARENT-CHILD RELATIONSHIPS

The relationship between a parent and child evolves over time through the course of specific developmental periods. The major periods of parent-child relationship development are (1) new parents and young children, (2) early childhood, (3) middle childhood, and (4) adolescent. Although there is a large diversity in family types (e.g., single-parent, same-sex parents), this entry will mainly focus on two-parent heterosexual families.

NEW PARENTS AND YOUNG CHILDREN (AGES 0–3)

The birth of a child is a time of great adjustment for new parents. For example, new parents will need to adjust quickly to having an infant in their lives who depends on them for all its physical and emotional needs. The first few weeks after a child's birth can be especially trying as parents make adjustments in their lives to establish the routines of infant care. One of the initial major decisions new parents must make is the type of child care for their infant. Some families can financially afford to have one parent stay home, typically the mother, and assume child care duties, whereas many families cannot. Out-of-home child care presents many challenges for new parents, including financial, work scheduling, and choosing among the type of care providers available in their local area. In general, research indicates that nonparental care is

not harmful to the developing relationship between the mother and infant. However, parents should actively evaluate the quality of care provided by various child care agencies before selecting one for their infant.

The initial transition to parenthood can be stressful and challenging to the existing marital relationship. If the marital relationship was strong before having a child, then new parents typically find more support in their relationship after the baby is born. Couples who can realistically anticipate what changes will occur to their lives (e.g., new responsibilities) before having a baby are generally more satisfied in their lives after the child is born. In general, couples who have more supportive and satisfying marital relationships are better able to manage the challenges following the birth of a child.

During the first 18 months of life, Erik Erikson suggests that it is very important for the infant to develop a sense of trust with parents and the environment. This initial development of trust is generally referred to as *parent-child attachment*. Attachment refers to the bond an infant makes to the parent (most typically the mother) in the early years of life and provides a basic foundation for future development of the child. Healthy parent-child attachments are generally related to better developmental outcomes for the child across the life span and are developed through the consistent, supportive, and caring interaction with a parent.

As the child becomes a toddler, the relationship with parents begins to change in certain ways. Toddlers increasingly become more mobile and are usually quite interested in exploring their environment. Also, toddlers experiment with the emerging use of language and communicating with others in the environment. Erikson suggests that toddlers (ages 18 months–3 years) struggle between their developing sense of autonomy and the need for others to take care of them. For example, the toddler is developing new ways to initiate interaction in the environment (e.g., walking, talking) while still very dependent on the parents for many things (e.g., food, toileting). Toilet training typically takes place between the ages of 2 and 3 and, when mastered, provides the toddler with more autonomy regarding this bodily function compared with prior dependence on a parent for diaper changing. It is important that parents provide high levels of nurturance and support for their children during this period of development.

EARLY CHILDHOOD (AGES 3–6)

Erikson suggests that children between the ages of 3 and 6 are more assertive in initiating activities with others and exploring their environments. Children at this age should be encouraged by their parents to show initiative and curiosity about their world and others around them. They are also discovering such things as responsibility for their own behavior and the impact their behavior has on others, while being socialized into the family (e.g., rules). In addition, this is a typical time for children to be socialized into learning environments, such as preschool settings.

In early childhood, some children may be placed in preschool, whereas others may remain at home with a parent. Similar to nonparental types of care at younger ages, the quality of a preschool program and its staff is important for parents to consider. Children enrolled in preschool programs will have opportunities to become socialized with structured learning environments and interact with peers. In general, children can benefit developmentally from attending a preschool program; however, the quality of the specific program should be assessed by parents before placement.

MIDDLE CHILDHOOD (AGES 6–12)

School entry is a major transition for children and parents at the beginning of the middle childhood years. The child adapts to the demands of the school environment while the parents adjust to having their child in school for a large part of the day. Children learn central academic skills, such as reading, writing, and mathematics. They are also socialized into their school environments and develop a greater set of social skills with others outside of their family. According to Erikson, the skills and attitudes children learn during this period of development contribute to their ability to interact with multiple people (e.g., teachers, peers) across environments. The more success children have at acquiring the skills of this period, the more successful they will continue to be in their later development. In general, it is important that parents establish and maintain a collaborative relationship with their child's teacher and school in order to support their development in this setting.

The parenting roles will likely shift as the child enters school. For example, at earlier ages, children need more physical assistance from their parents to accomplish things in their environment and assist

them with decision making. During this period, children depend on their parents less for many things as their physical and cognitive skills become more developed. Parents need to provide children with more psychological support, such as reassurance, boosts to self-esteem, and positive verbal reinforcement so that they develop a positive sense of self. For example, when children encounter novel and challenging situations, they look to their parents for reassurance, guidance, and praise for successful mastery of tasks. This is also a period when many primary caretakers (e.g., mothers) are more likely to enter the workforce, which can produce positive benefits as well as challenges for the particular parent and the family.

ADOLESCENCE (AGES 12–18)

The beginning of this period is associated with puberty, and this process marks the physical transition from child to adolescent. Puberty is a time of physical and psychological change for the adolescent and involves the development of the primary (e.g., development of sexual organs, pubic hair growth) and secondary (e.g., changes in voice, body hair growth) sexual characteristics. During this time, psychological changes in adolescents are also common and generally include things such as increased need for isolation from others, increased display of the range of emotions (e.g., anger, crying), increased sensitivity to and discomfort with physical changes in the body, and decreases in self-confidence. Erickson suggests that adolescents between the ages of 12 and 18 experience a struggle between identity and role confusion. For example, adolescents struggle with the changes produced by the process of puberty while trying to make sense of them and develop a secure identity. In addition, the peer group becomes more influential for the adolescent during this period.

Adolescence also signals a change for parents and how they relate to their children. For example, many parents find that earlier parenting practices do not work well for adolescents because they are making more choices and seeking more independence in their lives compared with younger children. Parents may also be surprised about the need for independence asserted by adolescents as they attempt to develop their own identities and gain more experience making choices in their lives. In general, parents find that adolescents increasingly want to be included in decision making that influences their lives. Parents can supportively include adolescents when making relevant family decisions and provide the structure to teach them how to make good decisions in their lives.

SUMMARY

The relationship between parent and child changes over time in accordance with the natural development of the child. Four major periods in child development are related to significant changes in the parent-child relationship: (1) new parents and young children, (2) early childhood, (3) middle childhood, and (4) adolescence. During each of these periods, the child works to accomplish specific developmental tasks while the parents strive to provide parenting practices that meet the needs of their growing child.

—Jason J. Burrow-Sanchez and Robert March

See also Parent-Child Interaction

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PARENT TRAINING

Parent training (PT) is an umbrella term for several related behavioral interventions designed to help parents address child noncompliance and disruptive behaviors. Unlike many therapeutic interventions for children, in which a therapist and a child work to resolve issues, in PT, parents are taught to be the primary "therapists" who implement changes in their own behavior or in the environment to influence changes in the child's behavior. Most PT programs focus on teaching specific behavioral techniques that parents can use across settings. Specifically, parents learn techniques to increase the value of their instructions, methods of positively reinforcing appropriate behaviors, and methods of decreasing reinforcement of inappropriate child behaviors.

THEORETICAL FOUNDATIONS

Constance Hanf is widely considered the "grandparent" of most current PT programs, applying operant behavioral principles to parent-child interactions in the 1960s. Hanf recognized that parental attention could serve as a strong reinforcer of child behavior. Thus, her model of PT included a component of child-directed play, to allow parents to practice attending to (i.e., socially reinforcing) the child's appropriate behaviors. In addition to helping parents increase their attention to nondeviant behaviors, this component also helped increase the salience (i.e., reward value) of parental communication. Another significant component of Hanf's PT program was teaching parents to reduce environmental reinforcement of inappropriate behaviors. Modern versions of this principle include "ignoring" and "time-out" procedures.

PT's evolution over the past 50 years has resulted in the development of a number of different programs designed to improve child compliance and parent-child interactions. Although programs vary in the applications and techniques used, all PT programs currently supported by empirical research maintain their emphasis on behavioral principles. Because of this, the programs discussed below are reviewed in terms of their unique components.

PARENT TRAINING PROGRAMS

Helping the Noncompliant Child

This intervention teaches parents to manage noncompliance in 3- to 8-year-olds by helping parents communicate behavioral expectations clearly and provide appropriate consequences for child behavior (McMahon & Forehand, 1984, 2003). As with other PT programs, this program emphasizes implementation of basic behavioral principles combined with a child-directed focus to improve the salience of parental commands as well as the parent-child relationship. McMahon and Forehand emphasize contingent attention and implementing practice time during the week so that parents can further develop their attending and rewarding skills in the home environment.

This treatment program has been the focus of much empirical research and has been nationally recognized as a best practice for family-based treatment. In two longitudinal investigations, treated families were functioning similar to the ("normal") comparison sample 4.5 and 10 years after the intervention.

Parents and Adolescents: Living Together

Patterson and Forgatch's (1987) program combines behavioral principles with social learning theory, extends the typical approach of managing behavior in young children to discuss how to manage problematic *adolescent* behaviors. Patterson and Forgatch focus on teaching families to balance self-interest with a sense of responsibility and to develop the necessary skills to form lasting relationships. In addition to specific behavioral skills, they also center on the role of parent modeling to help children and adolescents learn to respond appropriately to those around them.

Parent-Child Interaction Therapy

Parent-child interaction therapy (PCIT) is a short-term, evidence-based intervention designed for families with children between the ages of 2 and 6 experiencing a range of behavioral, emotional, and family problems (Eyberg & Robinson, 1982). Two

main phases define PCIT with child-directed interaction (CDI) as the initial focus and parent-directed interaction (PDI) implemented once the primary phase has been mastered. This PT program combines basic behavioral principles with a stress on more traditional play therapy techniques and problem-solving skills. PCIT places a strong emphasis on changing parent-child interaction patterns, thus incorporating elements of developmental psychology, attachment theory, and social learning theory. This program identifies characteristics in both the parent and the child as well as environmental factors that influence the parent-child relationship and behavior management.

Several studies have been conducted examining the efficacy of PCIT. Research has indicated that PCIT results in both clinically and statistically significant improvements in the interactional style of parents and children and in the behavior problems of children at home and at school. Parents also report high levels of satisfaction with the content and process of PCIT and more confidence in their abilities to manage their children's behavior. Longitudinal studies have found that parents who completed PCIT continued to report significant changes in their children's behavior 3 to 6 years after completing treatment.

Psychosocial Treatment for Attention Deficit Hyperactivity Disorder

Recent developments for managing attention deficit hyperactivity disorder (ADHD) have focused on the integration of PT (Barkley, 2002). Treatment techniques consist of training parents in general behavioral principles such as applying reinforcement or punishment after appropriate and inappropriate behaviors. The PT program relies primarily on a token economy wherein reinforcement procedures involve praise or tokens (e.g., poker chips, stickers). Punishment involves the loss of tokens or time-out from reinforcement such as parental attention. This treatment's rationale is that parents benefit from using more explicit, systematic, and external forms of presenting rules and instructions to children with ADHD. Although this PT program focuses primarily on behavioral principles, it does incorporate skills for developing more positive parental attention and encouraging parents to attend to children's compliance and independent play. By providing more positive attention to children while they are following directions and playing independently, parents reinforce more appropriate behaviors. This also helps to foster more positive parent-child interactions.

Only a few studies have been conducted examining the efficacy of PT in children with ADHD. Studies indicated that at a 1-year follow-up reevaluation after treatment, those families that received PT were no longer different from the control group, and the child's school behavior was rated by teachers as significantly better than before treatment.

Incredible Years Parents Training Series

The Incredible Years program is based on the theory that ineffective parenting, family factors, school risk factors, and peer and community risk factors influence the development of child conduct problems (Webster-Stratton & Reid, 2003). The Incredible Years Training Series targets parents, teachers, and children ages 2 to 8. The parent program focuses on promoting parent competencies and strengthening families by increasing parents' positive parenting and self-confidence while replacing critical and violent discipline with more positive strategies such as ignoring, logical and natural consequences, and problem solving. The Parent Training Series has two parts, BASIC and ADVANCE, which center on enhancing positive parent-child relationships, teaching nonviolent discipline techniques, and addressing parents' personal and interpersonal risk factors.

Empirical research on this program has shown significant improvement in parental attitudes and parent-child interactions while significantly reducing parents' reliance on violent and critical discipline and child conduct problems. Research has also demonstrated a significant improvement in parental communication, problem-solving, and collaboration skills when compared with parents who did not complete the ADVANCE program.

Parent Management Training for Conduct Disorder

The Parent Management Training (PMT) program combines cognitive problem-solving skills training with parent management training (Kazdin, 2003). In PMT, parents are trained to alter their children's behavior at home. Parents learn specific procedures to alter interactions with their children, to promote prosocial behavior, and to decrease inappropriate behavior. The theory behind this program is that coercive interactions

between parents and children reinforce aggressive child behavior. Additionally, many parents use punitive practices and commands that escalate problem behavior and ignore prosocial behavior. As with the other PT programs, PMT focuses on behavioral principles to reinforce positive behaviors. Parents are also trained to identify, observe, and define problem behaviors in new ways while developing and using a token economy system. Empirical studies have found PMT to produce reliable and significant reductions in antisocial behavior while increasing prosocial behavior.

CULTURAL DIVERSITY IN PARENT TRAINING

Although extensive empirical research has found success for PT programs, recent explorations of the literature have revealed a paucity of research examining cultural diversity and PT. PT programs often address family variables to increase program effectiveness, but most programs do not address cultural variables that affect parents' and children's views of appropriate behavior and discipline. Because research has not examined cultural variables and PT, clinicians remain uninformed about whether parenting programs should be modified for different cultural groups. Success in changing parent behaviors must consider parents' cultural backgrounds because parenting practices are influenced by cultural values about appropriate parenting and appropriate child behavior. Thus, future research in this area is essential to determine which aspects of PT programs are successful across cultures and which areas must be tailored to address cultural differences.

CONCLUSIONS

Although the PT programs discussed here are only a few of the many PT programs available, research consistently has indicated that parent involvement in treatment is related to long-term results of minimized behavioral concerns, even several months and years after the cessation of treatment. More empirically supported treatments are placing a focus on PT to help children maintain therapeutic skills across environments.

—Margaret M. Richards and Ric G. Steele

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PARENTING

"It is the entrusted and abiding task of parents to prepare their offspring for the physical, psychosocial, and economic conditions in which they will eventually fare and, it is hoped, flourish." This statement made by Dr. Marc Bornstein, an expert on child development and parenting processes, captures the essence of parenting. At its most basic level, parenting is the process of providing protection and care to children in order to ensure their survival; more ideally, parenting inspires and maximizes the child's potential.

SIGNIFICANCE OF PARENTING

The long-standing assumption that parents assert a direct, deterministic, and powerful influence on their children through the process of socialization has permeated research and theory on human development as well as most cultural belief systems. If children turn

out well, it is to the parents' credit; if they turn out badly, it is the parents' fault. Recently, this assumption has been challenged by researchers who highlight the role of biological influences on children's development. Behavioral genetic studies, for example, show that adopted children are more like their biological parents than their adoptive parents on basic characteristics such as personality, intelligence, and mental health. Additionally, some scholars have criticized the emphasis on parenting by asserting that other factors, such as peer relationships, exert a strong influence on development.

Researchers who study the significance of parenting emphasize several issues. First, in biologically related families, genetic and socialization influences are difficult to separate. For example, a child who is musically talented may have inherited that tendency from parents who are also musically gifted. Those same parents would be likely to highlight music at home, making it difficult to determine whether the musical child is a product of genetics, the environment, or (most likely) both working together. If instead that child were adopted by parents who were not musically inclined, the expression of that talent may take a different form or may be actively suppressed. Thus, genetic predispositions (strengths and vulnerabilities) are often modified through experiences created by parents.

Second, the stream of influence between parents and children is bidirectional rather than unidirectional (e.g., from parent to child). A parent who is impatient may cause an infant to react with distress, but an infant who is constitutionally prone to distress also may elicit impatience from the parent. Regardless of who has initiated the chain of events, parents and children often become locked into escalating cycles of action and reaction, in this case distress and impatience. Nonetheless, because parents are more mature and experienced than children, they play a stronger role in establishing the initial interaction patterns and can more effectively induce change by altering their responses (e.g., responding with patience to the distressed infant).

Finally, parents play a significant role in shaping children's environments and thus children's exposure to other factors that influence development, such as peer relationships. For example, parents are more likely than children to make decisions about the neighborhood in which the family resides, the schools that children attend, and many of the activities in which young children engage, and in these ways expose children to certain peers and not others. Additionally, children are more likely to select friends who have similar interests and values, which are rooted primarily in early family experiences. Even broad contextual factors such as poverty and culture are mediated by parents, who, in Bornstein's words, are the "final common pathway to children's development and stature, adjustment and success."

In summary, although past research has likely overstated the deterministic role of parents, scholars continue to document the important ways parents contribute to their children's development. Contemporary thinking on the significance of parenting embraces both nature and nurture, and an important agenda for future research is to study further how parents' socialization efforts interact with children's genetic heritage as well as with other contextual influences to explain the complexities of human development.

CHANGING FACES OF PARENTS

Parents constitute a more diverse group of people than ever before in history. Today's parents may be biologically related, adoptive, foster, or stepparents; they may be single individuals or gay or lesbian couples. First-time biological mothers range in age from younger than 15 to older than 50, with fathers potentially having a greater age span; and grandparents are described as one of the fastest growing segments of the parenting population. In many cultures, siblings take on parenting responsibilities, and in many nations, an increasing number of children spend a substantial portion of time being cared for by professional care providers. Today, only about 35% of children in the United States live in what used to be the traditional household: a household comprising two parents, with one who stays home full-time.

Table 1 presents general demographic information concerning family structure in the United States. This information provides a snapshot of living conditions but does not capture changes in family circumstances that characterize many children's early years. As indicated, 69% of all U.S. children reside in two-parent homes, with at least one biological or adoptive parent. This picture is qualified by race: 81% of children identified as Asian or Pacific Islander live in two-parent homes, compared with only 38% of children identified as black: non-Hispanic. Additionally, these numbers do not identify children whose households have been disrupted by divorce; researchers estimate

Table 1 U.S. Demographic Information (in Thousands) of Family Structure by Race/Ethnic Background

Race[1]	*All Races*	*White: Non-Hispanic*	*Black: Non-Hispanic*	*Hispanic*	*Other: Non-Hispanic*
Total population under 18	72,321	44,235	11,170	12,817	4,099
Family Structure					
Two-parent (bio/adopt/step)[2]	49,666 (69%)	34,011 (77%)	4,264 (38%)	8,338 (65%)	3,053 (74%)
Mother-only[3]	16,473 (23%)	7,124 (16%)	5,400 (48%)	3,212 (25%)	737 (18%)
Father-only[3]	3,297 (5%)	1,926 (4%)	595 (5%)	641 (5%)	135 (3%)
Neither parent	2,885 (4%)	1,174 (3%)	911 (8%)	626 (5%)	175 (4%)
Grandparent	1,273 (2%)	541 (1%)	487 (4%)	196 (2%)	50 (1%)
Other relative	802 (1%)	230 (1%)	255 (2%)	257 (2%)	59 (1%)
Non-relative	575 (1%)	301 (1%)	75 (1%)	141 (1%)	58 (1%)
Foster care	235 (<1%)	101 (<1%)	94 (1%)	32 (<1%)	8 (<1%)
Number in poverty[4]	12,133 (16.7%)	4,090 (9.4%)	3,817 (31.5%)	3,782 (28.6%)	NA

SOURCE: March 2002 Current Population Survey from 2000 U.S. Census.

1. U.S. Census groups people by ethnicity (Hispanic/Non-Hispanic) and by race, noting that those of Hispanic descent can be of any race. Space limitations preclude a complete representation of all groups included in the census.
2. Two-parent families include at least one biological or adoptive parent but may also include one stepparent.
3. Mother-only and Father-only also include households in which mother is cohabitating (11% of total) or father is cohabitating (33% of total).
4. Poverty estimates, including raw numbers and percentages, were drawn from *Poverty in the United States*: 2002 issued by the U.S. Census (2003).

that nearly half of all marriages end in divorce and that 50% to 60% of all children will live, even temporarily, in households headed by a single parent. Researchers also estimate that one third of all children, at some point, will live in a stepfamily, most likely one composed of a biological mother and stepfather.

A number of recent trends reflect the changing faces of parents. Many people are waiting longer to have children; according to 2002 U.S. birth data, a woman's average age at first birth was 25.1 (a historic high), compared with 21.4 in 1970. Births to unmarried women also reached a high in 2002 of 1,365,966; however, the rate of teen births has declined (30% over the past decade) to an all-time low. For young black teens, the birth rate has declined by 50% since 1990. In the past several decades, assisted reproductive technologies (ARTs) have undergone rapid development, and each year, a growing number of children are born using these technologies. Data from a 1995 report on family growth in the United States indicated that about 2% of women had used an infertility service within that year; another 13% reported having used an infertility service at some time in their lives. In 2001, 107,587 ART cycles were reported resulting in 29,344 (27%) live births and 40,687 babies. Finally, changes in legislation have allowed a more diverse group of people to adopt children. Whereas in the past, agencies routinely screened out applicants who did not meet specific criteria (e.g., economic), today's adoptive parents include those with varying socioeconomic means,

older and single individuals, and gay and lesbian individuals or couples.

PARENTING THROUGH THE STAGES OF DEVELOPMENT

The developmental tasks most salient to children change as they mature. For example, an important developmental issue for an infant is attachment, whereas a salient task for a toddler is individuation. Table 2 highlights some of the most significant developmental issues at each stage and the complementary parenting support for optimal development in these areas.

Parenting is at its greatest level of intensity during infancy and toddlerhood. In the first few years of life, children depend entirely on their caregivers, who determine most of their children's experiences. Caregivers decide, for example, whether an infant is held, talked to, or ignored and in what kinds of activities the toddler will engage. Because of the enormous flexibility of the human nervous system during the early years, this period offers unparalleled opportunities for learning and development, which are best supported by an enriched but not pressured environment. Further, although some theorists argue that later experiences can completely alter children's developmental pathways, many assert that the experiences over the first few years of life lay the foundation on which the rest of development builds. Like compounding interest, the investment that warm, engaged, and sensitive caregivers make during the early years pays huge dividends as the secure, self-confident child moves forward.

In the first few months of life, parenting focuses on the provision of basic care, ideally from a warm and responsive caregiver. The caregiver's sensitivity to the child's cues helps the child learn basic regulation and predicts the child's attachment security, which becomes organized toward the end of the first year. In the second year of life, the utterly dependent infant becomes the passionately autonomous toddler, inviting increasing opportunities for discipline (discussed later). Early and middle childhood bring new challenges as children move further out into the world. School adjustment and peer relationships become central, and here, too, children benefit from parents who are involved and supportive.

Adolescence, once characterized as a time of "storm and stress," is now viewed as a period of dynamic change but one that most children (75%–80%) navigate successfully. This period was once also characterized by a severing of ties between parents and their children; contemporary studies show that adolescents benefit from maintaining close and connected relationships with their parents even as they move toward greater independence. Dr. Lynn Ponton, a psychiatrist who specializes in adolescent development, noted that risk taking is a normal part of the important exploration in which teens engage. Parents play a critical role by encouraging their children to take positive risks, such as trying out for a sports team, running for a position in student government, or working on a special project. Adolescents engaged in challenging but positive endeavors are less likely to be drawn to negative risk taking, such as alcohol and drug use.

In summary, children across all stages of development benefit from parents who are warm, engaged, and responsive to their changing needs. Although the time spent in direct contact and interaction with children lessens as children grow older, parental involvement, guidance, support, and monitoring remain important. This may be especially true during adolescence, when parents play a crucial role in helping children to cross the bridge into adulthood.

PARENTING STYLES AND CHILD OUTCOMES

Dr. Diana Baumrind, a psychologist at the University of California at Berkeley, has produced some of the most well-known research on parenting styles. Baumrind's early work highlighted various dimensions of parenting, such as control and nurturance, that were especially important in predicting children's functioning. Subsequent research has focused on two global dimensions: *responsiveness* and *demandingness*. Parents high in responsiveness are attuned and sensitive to their children's cues. Responsiveness also includes warmth, reciprocity, clear communication, and attachment. Parents high in demandingness monitor their children, set limits, enforce rules, use consistent and contingent discipline, and make maturity demands. Taken together, these two dimensions create four parenting styles: *authoritative* (high demandingness, high responsiveness), *authoritarian* (high demandingness, low responsiveness), *rejecting/neglecting* (low demandingness,

Table 2 Developmental Tasks and Parenting Support

Stage of Development	*Developmental Tasks and Attainments*	*Parent's Role to Support Optimal Development*
Infancy	Physiological and behavioral regulation and organization	Sensitive, responsive care contingent upon infant's cues
	Interactional synchrony	Attunement
	Secure attachment	Secure base/safe haven
Toddlerhood and Early Childhood	Sense of autonomous self and sense of efficacy	Encouragement of exploration within safe, supervised environment
	Beginning of independent functioning	Secure base/safe haven; offering acceptable choices
	Developing sense of right and wrong; compliance; impulse control	Positive, consistent discipline; modeling appropriate behavior; coordinated and cooperative interactions
	Development of conscience; empathy toward others	Treating child with empathy; communicating other's perspective
	Movement into wider social group (e.g., peers)	Facilitating opportunities for social interactions beyond immediate family
	Gender identity	Accurate, age-appropriate information
Middle Childhood	Greater level of independence; movement into wider world	Monitoring risks; equipping children with safety skills; providing support
	Greater self-regulation and self-control; cooperation; responsibility-taking	Positive discipline; induction; open communication; co-regulation between parent and child; monitoring
	Successful school adaptation and transitions	Parent-teacher communication; parent involvement; emphasis on learning vs. performance
	Peer acceptance; close friendships; peer group membership	Facilitation of positive peer skills; awareness of and monitoring of peers
	More complex self/other understanding, incl. sex-role identification	Acceptance of child; tolerance for/celebration of diversity
	Self-confidence	Encouragement of and support for mastery
Adolescence/Young Adulthood	Successful navigation of puberty; body image	Support and guidance; avoidance of teasing
	Greater autonomy and self-governance; self-regulation	Increasing opportunities for autonomy; emotional connectedness
	Positive vs. negative risk-taking	Encouragement and facilitation of positive risk-taking; open communication
	Thoughtful vs. impulsive decision making and problem solving	Increasing opportunities for decision making; direct guidance around decision making and problem solving
	Identity exploration and consolidation	Support around identity issues; patience with exploration
	Peer relationships	Direct and indirect monitoring
	Dating and romantic involvements, incl. sexual experiences	Direct guidance and support, especially around risks and rejection/breakups
	Occupational plans	Encouragement for exploration; facilitating opportunities

SOURCE: Based on Cummings, E. M., Davies, P. T., Campbell, S. B. In *Developmental Psychopathology and Family Process: Theory, Research, and Clinical Intervention* © 2000 New York: Guilford (pp. 200–250).

NOTES: Development is dynamic and cumulative; successful navigation of early issues (e.g., secure attachment) supports later development (e.g., self-confidence). Likewise, although responsive parenting adjusts in specific ways to new developmental issues, certain parenting characteristics (e.g., responsiveness, involvement) facilitate development at all phases. Finally, the parent-child relationship is bi-directional and transactional; supportive parenting encourages optimal development, which further encourages supportive parenting.

low responsiveness), and *permissive/indulgent* (low demandingness, high responsiveness). Children who have authoritative parents tend to show the best outcomes (e.g., school success, good peer skills, high self-esteem). This is generally true across ages, ethnicities, social strata, and many cultures. In contrast, children who have rejecting/neglecting parents tend to show the worst outcomes (e.g., delinquency, drug use, problems with peers and in school).

Dr. John Gottman, an expert on marriage and family processes, identified four parenting styles by focusing on how parents handled their children's emotional states, especially negative emotions such as distress and anger. The *dismissing* parent disregards the child's emotions, may disengage from the emotional child or ridicule the child, and wants the negative emotions to disappear quickly. The *disapproving* parent is similar to the dismissing parent but is more judgmental and critical about the child's emotions and may punish the emotional child. Both styles are related to children who have difficulty trusting, understanding, and regulating their emotions. In contrast, the *laissez-faire* parent freely accepts the child's emotional states and may offer comfort but provides little guidance to help the emotional child solve problems. Children with laissez-faire parents have difficulty regulating their emotions, becoming, for example, overwhelmed by emotional states. Finally, the *emotion coach* is accepting and sensitive with an emotional child, respects the child's emotions without telling the child how to feel, and sees emotional moments as opportunities for nurturant parenting and teaching problem solving. Not surprisingly, children of emotion coaches have the best outcomes: they learn to trust and regulate their emotions and to solve problems. Being emotionally savvy, they get along better with peers and have higher self-esteem.

A third approach to parenting comes out of attachment theory, one of today's prominent theories on social and emotional development. Dr. John Bowlby, a clinical psychologist and the "father" of attachment theory, asserted that children develop deep emotional bonds (attachments) to important caregivers over the first few years of life. These attachment relationships, once essential for survival, form the basis for the child's emerging sense of self and relationship style. Children with secure attachments have parents who are sensitive and responsive to the child's attachment-related needs (e.g., holding the distressed child) but who also are supportive of the child's autonomy; children with anxious attachments have parents who are less sensitive, who may be rejecting of the child's needs for intimacy and attachment, or who thwart the child's developing autonomy. Secure children show the best outcomes in virtually every area of development. For example, they have higher self-esteem and get along better with other people, including peers and teachers; they are more persistent on cognitive tasks such as problem solving and know how and when to seek assistance. As adults, individuals who are secure about attachment issues are more likely to provide a secure base for their own children.

Taken together, these various approaches communicate important things about optimal parenting. Not surprisingly, children seem to do best when parents are warm and engaged, when parents are sensitive and responsive to children's needs, and when parents help children to understand and effectively cope with their emotions. Also important are that parents monitor their children, maintain age-appropriate expectations, set and enforce reasonable limits, use consistent discipline (see later discussion), and support the development of healthy autonomy. When thinking about parenting styles, it is important to remember that other factors like the child's temperament, sex, and social context interact with parenting. For example, children reared in dangerous environments may benefit from more restrictiveness on the part of the parent. Additionally, certain child characteristics (e.g., reactive, rebellious) may elicit certain parenting responses (e.g., tighter control).

DISCIPLINE PRACTICES

Discipline and punishment are often confused. Discipline comes from the Latin word, *disciplina*, meaning instruction, training, or knowledge, whereas punishment comes from the word, *poena*, meaning penalty. Discipline, then, includes techniques parents use to teach children desirable behavior, whereas punishment involves a punitive action designed to eliminate undesirable behavior. Scientists of human development agree that discipline is an important ingredient in optimal parenting; there is less agreement on the role of punishment.

The American Academy of Pediatrics has identified three components of effective discipline: a loving parent-child relationship, positive reinforcement to increase good behavior, and strategies for eliminating negative behavior. They strongly discourage the use

of physical punishment, and endorse, instead, the use of time-out or the removal of privileges for eliminating negative behavior.

Physical punishment, such as spanking, especially if used frequently, administered harshly, or used by parents who are also low in warmth and responsiveness, is related to negative child outcomes such as aggression and depression. In fact, children who are spanked frequently typically show worse, not better, behavior over time. Additionally, many forms of punishment are unlikely to correct misbehavior in the long term, even though they may control the behavior in the short term.

In contrast, positive forms of discipline are related to better outcomes over the long term, such as self-regulation, self-esteem, and the internalization of appropriate standards of behavior. Child guidance experts offer a number of suggestions for positive discipline, including setting up the environment for success (e.g., removing off-limit temptations, childproofing); setting clear limits and stating these positively (e.g., "please walk" instead of "don't run"); attending to, praising, and modeling good behavior; providing explanations so that children understand why compliance is important; and using natural and logical consequences to correct negative behavior. Induction, which involves making children aware of the consequences of their actions on others, is especially effective for internalization and self-regulation. For example, a group of children throwing water balloons at cars would be less likely to repeat that behavior in the future if the parent helped them to understand the possible consequences of their actions (e.g., causing a car crash) than if the parent responded by yelling, hitting, or using other forms of punishment.

In summary, although punishment may gain immediate compliance in the short term, positive discipline techniques are more effective in helping children learn to manage their own behavior. Such self-management becomes crucial, especially as children move forward into unsupervised environments. Experts on child guidance emphasize that discipline works best within the context of a loving, supportive, and compassionate relationship and that the most effective disciplinarian is firm but also kind at the same time.

WHY PARENTS PARENT IN THE WAYS THEY DO

Why does parenting seem so effortless for some but full of challenges for others? Why are some parents sensitive, responsive, and emotionally engaged with their children, whereas others are aloof, neglectful, or even abusive? Answers to these questions are complex: parenting is multiply determined by numerous factors existing within and between the parent and child, within the immediate context in which the parent and child are embedded, and within the broader social and cultural context.

At the most basic level are the parent and child. As noted earlier, children actively contribute to the parent-child relationship. Parents treat bold children differently than they treat reserved children, and they treat bold boys differently than they treat bold girls. Further, children, themselves, are likely to respond to parenting differently based on their own, unique characteristics. For example, gentle discipline that de-emphasizes power is effective with temperamentally inhibited children. However, uninhibited children benefit most from cooperative strategies that motivate them to identify with their parents. Parents, themselves, bring numerous factors to the caregiving role, including their physical and mental state and wellness (e.g., mood, depression), basic personality, cognitive processes (e.g., attitudes, beliefs, expectations), level of maturity and experience with children, capacities for self-awareness and reflection, and own caregiving history (discussed later). What may be especially important in how parents and children respond to each other is the "goodness of fit," that is, how the unique characteristics and needs of a child mesh with the internal and external resources of the parent.

Parents and children are embedded in a broader context of "family," potentially including other children, a partner, and extended family. The quality of the relationship with one's partner is especially influential. Both mothers and fathers benefit from having supportive relationships with a partner, and parents with that support tend to be warmer and more responsive to their children. Conflict, especially that which is unresolved and chronic, undermines parenting; interventions that bolster the partner relationship are likely to enhance parenting as well. Certainly, being a single parent invites multiple layers of stress, ranging from having no one with whom to share the daily responsibilities of parenting to managing overwhelming economic concerns. Extended family can provide important support to single parents.

Community and social factors, including the parents' world of work, the quality of the neighborhood, the social supports available, and general economic

conditions also affect parenting. Parents who enjoy safe communities, stable and fulfilling jobs, and a reasonable standard of living tend to focus more physical and emotional resources on their children. Parents living in impoverished, dangerous environments are likely to approach parenting differently, by being more restrictive and by demanding more immediate compliance, for example. Economic hardship, in particular, exerts a heavy toll on parents and children. The stress engendered by economic adversity is related to numerous problems, such as depression, anxiety, illness, and maladaptive coping (e.g., alcohol use), all of which compromise parenting. In general, as environmental conditions become more extreme, parenting becomes more disrupted. For example, in places where child mortality is high, parents show little investment in children they are not sure will survive.

At the outermost level are cultural influences, which often exert a nonconscious impact on parenting. That is, parents are likely to perpetuate the patterns and habits of their own culture with minimal awareness and reflection. Cultural prescriptions dictate specific parenting practices, such as where children sleep and how to discipline, as well as more global ideas, such as whether children are socialized toward compliance or self-assertion.

In summary, no single factor can completely explain why people parent in the ways they do. Positive factors at each layer (e.g., child with easy temperament, loving family history, stable finances) enhance parenting, whereas negative factors (e.g., child with challenging temperament, abusive history, poverty) present risks. The combined and cumulative picture provides the most complete explanation for differences among parents—why, for example, one parent is responsive while another is neglectful or abusive.

INTERGENERATIONAL PARENTING PATTERNS

Although parenting is influenced by numerous factors at varying levels (discussed earlier), some of the central qualities of parenting can be predicted from the parent's childhood history and how the parent remembers and reflects on that history. Major disruptions in parenting, such as child abuse, are predictably related to similar problems identified in the parent's own childhood; but even subtle differences among parents, such as comfort with intimacy, are associated with childhood experiences. These intergenerational influences are powerful and often nonconscious; indeed, many parents find themselves repeating intergenerational patterns that they vowed to break.

Although they are powerful, intergenerational cycles are by no means inevitable. The key to breaking negative patterns is to bring to conscious awareness what is nonconscious and to reflect before reacting. Also important is to resolve early negative experiences. For example, parents who have experienced abusive caregiving in their own childhoods are better able to provide optimal care for their children when they are aware that the abuse occurred, can thoughtfully reflect on how the abuse has affected their adult personality and their reactions to their children, and can come to some resolution about their abusive past. In contrast, parents who dismiss the impact of early experiences or who are overwhelmed by hostility and anger about those experiences are at high risk for perpetuating negative cycles. Clinical case studies indicate that the psychological work involved in the processes of awareness, reflection, and resolution is difficult and painful and that it often takes great courage to face one's past. Engaging in some type of therapeutic intervention can provide the support necessary to complete this work.

CONCLUSION

Most people become parents at some time in their lives and regard parenting as one of life's most important yet challenging endeavors. Parenting invokes people's deepest emotions, from great joy to debilitating fear to powerful rage. To be sure, no parent is perfect, and virtually all parents experience times of self-doubt and struggle. When parenting is more painful than joyful, when families are trapped in hurtful cycles, or when parents feel as though they are losing control, intervention is important. Although the United States lags behind other developed nations in the provision of formalized resources to parents, support is available to parents through public and private agencies. Many community health centers sponsor resource and crisis lines where parents can get immediate assistance or referrals to other services. Numerous Web sites also offer connections to expert guidance and to other parents; sometimes simply feeling connected to others who struggle with similar issues can provide relief. Getting help is the mark of a courageous and committed parent; with support, all

parents can create positive change from which they and their children will benefit.

—Molly Kretchmar-Hendricks

See also Authoritative Parenting Style; Baumrind, Diana; Bowlby, John; Parent-Child Interaction

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PARENTS ANONYMOUS

Parents Anonymous Inc., one of the largest, international child abuse prevention organizations, is committed to strengthening families through mutual support and parent leadership. Through a network of accredited organizations, parents, and volunteers, Parents Anonymous has developed and implemented a variety of strategies for ensuring positive outcomes for families, including groups for parents and children, advocacy, public education, research, training, and technical assistance.

In 1969, Jolly K. was a single mother concerned about her own parenting ability and seeking to provide a safe and supportive home for her family. Hoping to find an alternative to traditional therapy that frustrated Jolly K., she partnered with her social worker and launched an innovative strategy for supporting families and preventing child abuse—the Parents Anonymous Group. This group provided a unique opportunity for parents with similar problems to share their concerns, explore solutions, and support each others' desire to change. The positive experiences of those first Parents Anonymous group members gave rise to a national movement based on shared parent leadership and mutual support.

Today, Parents Anonymous defines its mission as a commitment to three specific goals: (1) strengthen families and build strong communities, (2) achieve meaningful parent leadership and shared leadership, and (3) lead the field of child abuse and neglect. Furthermore, Parents Anonymous was founded on four guiding principles that today form the basis for all of its activities and services:

- Meaningful parent leadership shapes families, services, and communities.
- Effective mutual support creates a sense of community and belongingness.
- Successful shared leadership between parents and professionals strengthens families and improves services.
- Long-term personal growth occurs through transforming attitudes, learning new behaviors, and building on strengths.

Based on these principles, Parents Anonymous has developed a myriad of activities and services. For example, Parents Anonymous Inc., the national organization, provides training, technical assistance, advocacy, research, and other forms of support for a national network of accredited state and regional organizations working to promote parent leadership and support initiatives in local areas. Additionally, the Parents Anonymous Parent Leadership program, a network of parent leaders from local organizations, provides training and technical assistance for professionals and parents and participates in public education, outreach, and advocacy efforts promoting leadership.

Every year, about 100,000 parents and their children seek help and support from the community-based Parents Anonymous Adult Groups and Children's Program. These groups, held all across the country, meet weekly for 2 hours and are free of charge to participants. Adult Groups are open to any adult concerned about his or her parenting abilities (e.g., grandparents, foster parents, stepparents, and older siblings), regardless of the age of their children, and take place within a variety of settings (e.g., Head Start centers, prisons, battered women's shelters, and family resource centers). Co-led by one elected parent leader and one volunteer professional facilitator, the Adult Groups do not prescribe to a specific procedure. Rather, groups share a set of values based on the organization's guiding principles and the belief that all aspects of parents' life can affect the parent-child relationship. Frequently discussed issues include parenting stress, communication, discipline, child development, and child-rearing attitudes.

While parents attend the Adult Groups, their children may participate in the Parents Anonymous Children's Program held at a corresponding time and location. The Children's Program provides a supportive, safe environment for children of all ages to gain positive social skills, improve their problem-solving abilities, and increase their self-esteem. The curriculum-based program engages children in a variety of developmentally appropriate, hands-on activities designed to stimulate social and emotional development. As a complement to the Adult Group, the Children's Program aims to support positive family changes by ensuring that children's needs are met and by providing an opportunity for children to learn from one another.

—Amy L. Madigan

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PEER PRESSURE

Peer relationships are important for the socialization of children and adolescents Peer groups are important for the development of a sense of well-being. Affiliating with peers is a key developmental task of adolescence, leading to a sense of identity and psychological independence from parents.

Along with the benefits of peer group membership come drawbacks. The effects of peer pressure have for decades been a focus of research. Peer pressure is the channel through which peer group norms are communicated and group cohesion is strengthened when peers convince each other to conform to the norms of the group. However, problems arise when the pressures adolescents exert on each other encourage behaviors that are dangerous, unhealthy, or illegal. Much research attention during the past 20 years has been focused on shedding light on issues of peer influence for negative behaviors, such as identifying peer, self-, and parent-related variables that contribute to the peer influence process. This research has demonstrated the risks associated with peer pressure.

Adolescents are often under significant pressure to strive to become "popular" or a member of the "popular" crowd. These high-status groups, the social goal-states of many adolescents, frequently are characterized by a subculture of norms and values that contradict adult expectations. Although the culture of these "popular" crowds is often also distinctly at variance with adolescents' own beliefs and behaviors, they seek to become part of these crowds anyway. Ethnographic studies have provided evidence that attaining high peer status is a primary goal for many adolescents and that some youth will employ any means necessary to do so. "Popular" adolescents often are the context in which processes of peer influence for antisocial and risk-taking behaviors take place.

TOWARD A DEFINITION OF PEER INFLUENCE

Beginning in the 1960s, researchers have sought to measure the processes by which youth influence, and conform to, the behavior of peers. Early experimental research focused on conformity to peer group behavior, similar to Asch's line-judging studies with adults. The phrase *peer pressure* was coined in the 1980s to explain the new rise in antisocial behavior by

adolescents, and prompted more ecologically valid field studies of influence and conformity in school settings.

An important distinction is made between *peer pressure*, or the direct attempts by peers to instigate or prevent behaviors, and *peer influence*, or the indirect social influence of peer behaviors that occur naturally as part of a peer group's norms. Early studies of peer influence in adolescence were based on social psychological theories, such as Sherif's reference group theory. In a classic experiment modeled after Asch's paradigm, researchers established consensus among a group of confederates and measured target adolescents' conformity to the group norm. Although no direct pressure was applied, the normative response of the reference group was sufficient to change the targets' behavior.

In other studies, peer influence has been defined as occurring within the context of interactions with peers whose opinions and influences are clearly present and with whom the individual identifies. Such an indirect, noncoercive view of influence has been implicitly adopted by researchers who see influence as simply the behaviors of the target's close friends or peer group. Others have defined influence as the difference between the frequency of level of a target's self-reported behaviors and the levels of the same behaviors reported by the target's friends or best friend. These researchers measured peer influence as an indirect phenomenon involving no actual act of pressure or coercion on the part of peers.

More *direct, coercive* conceptualizations of peer influence have also been used but are less common. Researchers have sometimes defined peer influence in terms of direct attempts by peers to change, instigate, or prevent specific behaviors. Some researchers have defined direct influence as the strength and valence of peers' reactions to certain behaviors. Others have focused on verbal encouragement by peers to engage or not engage in certain activities. Some researchers even have conceptualized peer pressure simply as the frequency of being offered drugs, alcohol, or cigarettes by peers. Finally, given the important role of parents and peers in the transition to adolescence, definitions of influence that emphasize choosing peer-sanctioned over parent-sanctioned behaviors have also been used.

MEASURING AND CONCEPTUALIZING PEER INFLUENCE

Experimental Methods

Asch's line-judging paradigm to measure conformity sparked interest in the idea of conformity to group norms and provided a promising method by which to investigate the process in children and adolescents. Studies of influence and conformity in this tradition focused on moral reasoning, stimulus ambiguity, and the attractiveness of the influencer. These studies confirmed that influence and conformity occurred in young populations and that the construct was valid for developmental research.

Hypothetical Vignettes

More recent studies have moved away from experiments to assessments that allow influence research to be conducted within the peer context, such as the school environment. Hypothetical vignettes have been used to obtain information about participants' most likely reaction to a given situation or provocation. Vignettes have also been used to ask adolescents to make a choice between peer-sanctioned activities and parent-sanctioned activities. Others used vignettes to assess children's responses to peer pressure for positive, negative, and neutral behaviors. Children were asked to indicate their likely course of action (e.g., join friends in the activity vs. do something else) as well as the certainty that they would respond in that way. In research using hypothetical vignettes, developmental changes in susceptibility to peer influence have been found, as well as gender differences, with boys conforming to peer pressure for antisocial behavior more than girls.

Similar measures have been used again as an index of adolescents' conformity dispositions to study the relative contributions of conformity dispositions and perceived peer pressure to positive and negative behaviors. Both contributed significantly to the prediction of misconduct and antisocial behavior. Researchers studying the social pressure to smoke in adolescence also have used vignettes to measure the motivation behind smoking. The vignettes varied with respect to the composition of the group imposing influence (e.g., one friend vs. several friends), the nature of the relationship between the target and the group (friends vs. strangers), and whether or not the group was already smoking or if the target would have to initiate the smoking.

Comparisons of Target and Peer Behavior

The most common method of studying peer influence consists of comparisons between the self-reported

behaviors of adolescents and the behavior of their best friends or peer group members. This method has been used frequently in studies of antisocial or health-risk-taking behaviors. Some studies have compared adolescents' self-reported behaviors to their perceptions of their friends' behaviors or approval of those behaviors. Others have compared adolescents' self-reported behaviors with their friends' self-reported behaviors.

Similarity between adolescents' behavior and that of their friends or peers does not prove conclusively that influence has taken place, especially if the target participants themselves report the peer behaviors. Using target perceptions of peer behavior will inflate the estimation of influence because adolescents overestimate how similar their peers are to themselves. Similarity in peer behavior may also be attributable to friend selection rather than peer influence, or the process of choosing one's friends based on existing similarities and shared interests. Careful analyses are needed to separate selection from actual influence.

Self-Report Questionnaires

Self-reports of perceived peer pressure have been used in studies of the relative predictions of self-reported peer pressure (direct influence) and friends' behavior (indirect influence) on the occurrence of high-risk behaviors. Varies studies have found that self-reports of direct pressure predict drug use in middle adolescence. Other studies found that these measures predicted cigarette smoking and drug use over and above the effects of conformity, stressful life events, or parental influence. These measures assess what adolescents perceive as influence rather than assuming influence that may actually be due to friendship selection.

Brown and colleagues developed the Peer Pressure Inventory (PPI) to measure perceived pressure in five areas: involvement in social activities, misconduct, conformity to peer norms, involvement in school, and involvement with family. The PPI showed that perceived pressure to engage in misconduct increased with age for boys and girls. Santor and colleagues developed a peer pressure scale to distinguish peer pressure, general conformity (e.g., to authority figures and parents), and the need to be popular. Improving or maintaining one's social status is a key goal for many adolescents. More research is needed to examine the link between conforming to peer pressure and changes in popularity or peer status.

CONCLUSION

More than 30 years of experimental and field research has shown that the influence of peers is a robust predictor of behavioral patterns in childhood and adolescence. Peers' direct and indirect influences are at the core of high-risk behaviors such as smoking, alcohol and drug use, and promiscuous sexual activity. The importance of the study of peer influence is evident.

—Antonius H. N. Cillessen and Lara Mayeux

See also Peers, Social Development

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PEERS

During the first year or so of life, parents are the people with whom infants spend most of their time in social interaction. Even during infancy and toddlerhood, however, children are capable of forming intimate, lasting relationships with peers, as psychologist

Carolee Howes has discovered. As children grow older, peers take on a larger and larger role in children's social lives until adolescence, when teenagers spend more time with peers than they do with their parents. What we see then is a gradual transition from parents having primary importance in children's lives, at least in terms of the time spent with them, to peers taking on the more significant role by adolescence.

Researchers have sometimes disagreed about the role that parents and peers play in terms of influence in children's lives. Judith Rich Harris' provocative paper on peer relationships stimulated considerable controversy because she suggested that peers, and not parents, are the primary socialization agents of children. The general consensus, though, is that the relationship that both children and adolescents have with their parents is extremely important and affects the quality of peer relationships in various ways throughout development. Certainly by adolescence, however, peers may come to exert a potent influence on development. Issues such as cliques and crowds, conformity and peer pressure, popularity and leadership, and the role of peers in choices that adolescents make about issues such as drug and alcohol use and sexual behavior all have the potential to drastically affect adolescents' lives, often well into adulthood.

PEER RELATIONSHIPS IN INFANCY AND TODDLERHOOD

Social interactions between babies are relatively rare, compared with interactions between older children, and in most cases are orchestrated by nearby adults. In addition, infants are fairly limited in their ability to engage in social interaction with other infants. However, babies who are placed in close physical proximity to peers will look at, smile at, vocalize toward, and reach out for these other babies. By 6 months of age, babies smile and babble at peers in much the same way as they do with parents. They also begin to engage in reciprocal interactions with one another.

Toward the end of the first year and into the second year, children's increased mobility allows them, in a group environment, to seek out interaction with peers on their own initiative. And, as Carolee Howes has demonstrated, toddlers are capable of selecting particular children with whom they wish to interact. In addition, children's developing verbal skills allow them to move beyond nonverbal means of communication and to begin using language to express wants and needs and to engage in turn-taking. However, these interactions often involve imitation, rather than some truly coordinated play activity, like playing a game. Also, sustained interaction is rare. Most of children's peer interactions during infancy and toddlerhood take the form of watching other children or playing in parallel with others. Mildred Parten's classic 1932 study of children's social interactions during play demonstrates the progression from nonsocial to social involvement during the first few years of life.

Parten analyzed styles of social play and proposed a three-step sequence for the development of this kind of play. The first level is nonsocial activity, which Parten found was the most common type of play for children younger than 2. This involves unoccupied or onlooker behavior, in which the child might be watching another child but not participating or engaged in what is going on. Nonsocial activity also includes solitary play, in which a child is engaged in some activity alone.

Between the ages of 2 and 3, children begin to engage in parallel play. In this type of play, children play near each other, sometimes even side by side. They often play with similar materials, but do not interact or try to influence one another's behavior.

Then, between the ages of 3 and 6, children engage in associative play and cooperative play. Associative play is similar to parallel play, in that children play near each other with similar materials. However, at this stage they do interact—so they may exchange toys or comment on other's behavior. Cooperative play is the most advanced type of play in Parten's classification system. Here, both children are oriented toward a common goal. They may be acting out a make-believe theme or working together to complete some activity.

Further research on play has shown that as children get older, they do add these higher forms of play to the earlier forms. However, they still can engage in all of these types of play, depending on the situation. For example, as children get older, they acquire associative or cooperative styles of play, but still sometimes engage in solitary or parallel types of play as well.

PEER INTERACTION DURING EARLY CHILDHOOD

The third and fourth years of life mark significant changes in children's peer relationships. As described

earlier, Parten's work indicates that children become capable of much more sophisticated kinds of peer interactions than they were in infancy and toddlerhood. Children are much more likely to engage now in cooperative play, a type of play in which children work together to decide what the topic or theme of their play will be (e.g., playing "house," building with blocks, putting together a puzzle). This type of play is much more complex and involved than parallel play, owing in part to the obvious change in the level of social involvement, but also to the child's growing cognitive abilities. The ability to engage in dramatic play, for example, involves a number of social-cognitive skills such as perspective taking and knowledge of other minds (known as "theory of mind"), as well as language skills that allow children to engage in complex verbal descriptions of the dramatic play theme and exchanges of dialogue as children carry out the theme of the play.

In general, we see children's increasing cognitive maturity being reflected in their play. Another way that types of play have been conceptualized is in terms of cognitive maturity being displayed. During infancy and toddlerhood, children's play is primarily functional or sensorimotor, involving simple, repetitive motor movements. Children may engage in activities such as running in circles, rolling a toy car back and forth, or kneading a ball of clay.

During early childhood, children begin to engage in constructive or mastery play. This type of play involves creating or constructing, such as making a house out of toy blocks, drawing a picture, or putting a puzzle together. At this age, children also show a greater interest in pretend or dramatic play. Here, children are using objects to substitute for pretend objects (e.g., pretending that a block is an airplane, or acting out everyday and imaginary roles. By middle childhood, children are able to play games with prearranged rules, such as board or card games, or organized sports such as baseball or soccer.

During early childhood, children also begin to spend greater amounts of time with peers. In addition, this time is often spent at the child's request, rather than the parent's. Children also become more selective about whom they wish to play with. Eleanor Maccoby, one of the leading researchers on gender differences in children, has found that children tend to split into same-sex peer groups during early childhood, a pattern that continues until adolescence with few exceptions. Maccoby and other researchers have also found that there are gender differences in both the types of children's play and in their verbal interactions during play. Boys are more likely to play outdoors, in larger groups. Girls are more likely to play indoors, in smaller groups or in dyads. When negotiating conflicts, girls are more likely to try to defuse or mitigate conflicts by using strategies like clarifying the other person's feelings, changing the topic, or offering compromises. Boys, on the other hand, are more likely to use direct commands, threats, or physical force to persuade.

When children interact with friends, these interactions also have unique characteristics. Children spend more time with their friends than they do with children who they do not name as friends. Judy Dunn has found that children resolve conflicts differently with friends; they tend to be more forgiving of a friend than of another peer or a sibling. Dunn has also found that friends often show a high degree of caring and intimacy toward one another.

Children also show signs of distress when they lose a friend. In Howes' research with toddlers, she found that when children were separated from a friend because of a change in the day care arrangements, children who lost friends suffered some negative consequences. They had a harder time entering peer groups, engaged in less advanced forms of play, and were rated as more hesitant by teachers.

Friends also show differences in the types of play they engage in. Children who have close friends tend to use more advanced forms of play, such as cooperative and pretend or dramatic play, than children who do not have long-term, close friendships. There are certain skills that children develop when they interact with friends that allow them to use these more advanced types of play. In the context of friendships, children develop the ability to make their wants and needs clear to the other person and to make clarifications when necessary. They also develop listening and perspective-taking skills and have a better understanding of what the other child's role or contribution to the play will be. There is a higher degree of reciprocity between friends, such that when a friend makes a positive gesture or comment, children are more likely to respond positively in kind. Friends seem to agree more than they disagree, and as previously discussed, they are able to manage those disagreements effectively when they do occur.

PEER INTERACTION DURING MIDDLE CHILDHOOD

Once children reach middle childhood, both the nature of children's relationships with peers and their understanding of those relationships become more intimate and complex. When preschool children are asked about the nature of friendship, for example, they typically describe who their friends are in terms of shared activities (e.g., "Mandy's my friend because we play dolls together"). By middle childhood, children realize that friends are people who have spent time together, know each other well, and share common interests. In middle childhood, one of the most important qualities of friendship is trust. A child at this age might say that they are friends with someone because that person "keeps all my secrets. We care about each other and we like to do the same things." Children at this age also understand that friendship is an ongoing commitment, one that doesn't end because of day-to-day disagreements. Advances in children's cognitive skills are partly responsible for their changing conceptions of friendship. Children are more capable of perspective-taking now than they were in early childhood, so they are more aware of others' thoughts and feelings. As they develop more awareness of others' points of view, they are better able to understand the personal interest and characteristics that they share with friends. In addition, they are more aware of the long-term nature of the friendship and thus are more likely to negotiate with friends in cases of disagreement to preserve the relationship.

Friends and relationships within the peer group are obviously much more important to children now than in preschool. Another aspect of social relationships that becomes an issue during middle childhood is children's status within the peer group—whether they are popular or not. Sociometric techniques are measures that have been used to learn what children's peer status is. These techniques may involve asking children to nominate peers they like or don't like, or children may be asked to rank-order every child in the peer group from those they like most to those they like least. These measures yield five categories of acceptance: (1) average, (2) popular, (3) neglected, (4) controversial, and (5) rejected. Children's peer status tends to be well correlated with the types of behavior they display toward their peers.

Some children are rated average in terms of peer status. These children are liked by some children and disliked by others. However, they do not receive high numbers of either positive or negative rankings from their peers.

Popular children are well liked by their peers. They tend to engage in cooperative, friendly social behavior. These children are good perspective takers and are more sensitive to the thoughts and feelings of others. For example, they are likely to ask for an explanation when they do not understand another child's reaction. They also provide their own rationales or suggestions in cases of disagreements with peers. When popular children want to enter an ongoing play activity, they fit themselves into the flow of the play rather than disrupting the play or simply standing by and watching. They are typically viewed as kind and trustworthy and often take on leadership roles within the peer group.

Neglected children seem to go largely unnoticed by their peer groups. These children are less talkative and less socially active than average, but are not less socially skilled than most children. They do seem to enjoy spending time alone in solitary activities. They don't report feeling very lonely or unhappy and simply seem to be less visible to their classmates than other children.

Controversial children tend to receive either strongly positive or strongly negative reactions from their peers. These children can be hostile and aggressive, but they can also engage in positive, prosocial behaviors. These extreme types of behavior are very salient to classmates, and these children are often regarded as leaders, even though some kids dislike them. Because they have positive qualities, they tend not to be excluded socially—they usually are relatively happy and comfortable with their peer relationships.

Rejected children have been the focus of a great deal of the research on peer status, primarily because they are viewed as the group of children most at risk for negative developmental outcomes. Children who are rejected are actively disliked by their peers. These children report feeling unhappy and alienated from their peer group. In addition, rejected children are more likely to do poorly in school or to drop out of school altogether, and they are at higher risk for aggressive, antisocial, and delinquent behavior and for substance abuse problems.

There are two subtypes of rejected children. Rejected-aggressive children have high rates of conflict and are described as hostile by their peers. These children also tend be inattentive, impulsive, and hyperactive. They are also more likely to interpret

others' intentions as hostile and to blame others for their social problems. The second category is rejected-withdrawn children. There are fewer children in this subtype than in the rejected-aggressive subtype. These children are more socially withdrawn. They are viewed by their peers as awkward, passive, and socially incompetent. Rejected-withdrawn children report that they feel very lonely and are often concerned for their personal safety. Research studies indicated that they are more at risk for victimization by their peers.

Rejected children seem to have difficulty thinking about or deciding how to enter social situations effectively. For example, a rejected child (or a child at risk for becoming rejected) is more likely to think another child is being hostile, such as interpreting a request for something (e.g., a pencil in class) as a demand. If the rejected (or at-risk) child then responds with hostility, and the other child does likewise, then an argument may result. Over time, these kinds of interactions can lead other children to either begin to experience rejection or to continue to be rejected if the cycle was begun at some earlier point in time. Some intervention programs have tried to train rejected children to observe their peers more carefully and to think about their peers' behavior and intentions in more detail before responding.

PEER INTERACTION DURING ADOLESCENCE

Peer relationships also undergo certain changes during adolescence. One of the biggest changes is the amount of time spend with peers. One estimate is that not counting time spent in class in school, teenagers spend about 22 hours per week with their friends—often more time than they spend with their families. Typically, adolescents enjoy the time they spend with friends more than many other activities. They feel that they share a common bond with friends that they don't share with parents or siblings during this period of development.

The characteristics of teenagers' friendships are similar in certain ways to those of school-age children, but also reflect the changing cognitive capabilities of the adolescent. Adolescents choose friends with similar interests, but also individuals with similar aptitudes, values, and beliefs. A clique is a relatively small peer group that interacts on a frequent basis. These are groups based on friendship, and members are usually of the same sex and race. A crowd is larger group that shares certain characteristics but may or may not interact consistently. Crowds are often designated based on stereotyped perceptions rather than on similarities in actual traits and characteristics. Some common crowds include jocks, brains or nerds, druggies, and popular and unpopular groups.

In the context of friendship, another important quality in adolescence is the support that friends give one another. That support becomes even more important during adolescence than in earlier years. The intimacy that adolescents develop with friends is one of the major paths to identity formation. Adolescents share their most personal feelings and values and beliefs with their friends. This is part of what helps them define themselves and explore their identities. At younger ages, intimacy is important, but a self-disclosure by one child is often responded to by another child saying "Oh yeah, me too." Adolescents are more likely to discuss at length the nature of their feelings and how to resolve issues and problems in their lives. Friendships therefore provide an important source of social and emotional support but also play a pivotal role in helping the adolescent define his or her own identity.

Adolescents discuss different issues with friends than they do with parents. Issues related to their future, such as education and career plans, are discussed with both parents and friends. However, adolescents typically consider their parents' opinions to be more important when making decisions about these things than the opinions of their friends.

Teenagers typically discuss issues like social events, hobbies, clothes, dating, sex, and drug use with their friends, rather than with their parents. They are also more likely to be influenced by friends on these issues and to discuss problems in these areas with friends than with parents. Conformity, or peer pressure, represents the tendency of adolescents to imitate or be influenced by their peers as a means of acceptance. Conformity peaks in adolescence and is highest for activities central to peer culture—dress, appearance, social activities, and dating. Thus, an adolescent is more likely than a younger child or young adult to go along with what their peers are doing, whether that be playing in a band, trying out for the football team, shoplifting, or trying drugs for the first time.

Substance Use in Adolescence

Some of the biggest decisions adolescents must make, with regard to drug use and sex, may be greatly

influenced by peers and influenced very little by parents. With respect to drug use, adolescents who become involved with substance use typically have friends who do the same.

A federal survey on children's well-being provides recent statistics regarding adolescent drug use. Some of these statistics include the following:

- In 1999, 8% of 8th graders, 16% of 10th graders, and 23% of 12th graders reported smoking cigarettes daily in the previous 30 days.
- In 1999, heavy drinking remained unchanged from 1998, with 31% of 12th graders, 26% of 10th graders, and 15% of 8th graders reporting heavy drinking (i.e., having at least five drinks in a row in the previous 2 weeks).
- The percentage of 8th, 10th, and 12th graders reporting illicit drug use in the past 30 days remained unchanged between 1998 and 1999. In 1999, 26% of 12th graders reported using illicit drugs in the previous 30 days, as did 22% of 10th graders and 12% of 8th graders.
- The percentage of students in each grade level reporting illicit drug use in the past 30 days increased substantially between 1992 and 1996—from 14% to 25% for 12th graders, from 11% to 23% for 10th graders, and from 7% to 15% for 8th graders. Since 1996, rates have remained stable or have decreased.

Most of the drugs adolescents use are legal—tobacco or alcohol, for example. Most adolescents have tried both of these drugs, but the percentage of adolescents using these drugs on a regular basis is a minority. About half of all high school seniors have tried marijuana, and about 25% report using it on a regular basis. The percentage of adolescents who have used other illegal drugs is much smaller—about 10%. However, alcohol and marijuana are considered to be gateway drugs—drugs that open the door for adolescents to start using more serious illegal drugs like cocaine or LSD. Adolescents who begin drinking or smoking marijuana before 9th grade may be especially at risk. Excessive drug use during adolescence is also related to higher rates of both risky sexual behaviors and antisocial behaviors. These adolescents are also more likely to be in poor health, to be depressed, and to drop out of high school.

Adolescents who develop substance abuse problems are more likely to come from families with high rates of conflict and hostility or from families that engage in very little communication and affection. In addition, these adolescents are more likely to have problems with anger and impulsive behavior and to have difficulties in school. Peers are another influence—as has been discussed, adolescents are paying attention to what their peers do; and the opinions of peers become more important at this age. Adolescents are therefore likely to seek out peers who share their attitudes toward substance use.

Prevention programs designed to lower the rates of substance use and abuse in adolescents show varying degrees of success. Some programs are based on improving the individual's coping and decision-making skills. These programs involve showing adolescents how to assess risks and how to make decisions, taking responsibility for one's own behavior, and developing coping skills to deal with anxiety or conflicts with other people. However, these programs have been much less successful than programs that also target the family and community. Systemic interventions that attempt to change the environment of the adolescent are more likely to succeed because the adolescent is not alone in the struggle to avoid drug use.

Sexual Relationships and Adolescent Pregnancy

Adolescents are engaging in a new type of peer relationship—the heterosexual or homosexual peer relationship. Heterosexual adolescents who have avoided much interaction with members of the opposite sex as children start to show an interest in developing friendships and dating relationships with members of the opposite sex during adolescence. Most adolescents start to show interest in dating around age 12 or 13, and most have begun to date by the age of 16 or 17. Dating serves a number of functions; it can be a path to selecting a mate—dating helps you find out what kind of person you would eventually like to marry; social function—something that is fun to do and that gives you the chance to get to know a person of the opposite sex and what they are like; status—attractiveness is one of the first things adolescents consider when deciding whom to date; and sexual gratification—sex drive is kicking in as result of sex hormones, and dating is way that adolescents become involved in sexual behavior.

A small percentage (probably between 1% and 10%) of adolescents describe themselves as homosexual, and between 10% and 25% of adolescents have had a sexual experience with a member of the same

sex. However, homosexual adolescents face a number of obstacles. They may be unsure about their sexual orientation, and many have heterosexual relationships as well as homosexual ones. It may be difficult to find same-sex dating partners who are willing to have a public relationship. These adolescents also face the possibility of rejection, harassment, or even physical assault by others. Homosexual teenagers have higher rates of both depression and suicide than their heterosexual counterparts. Once they reach early adulthood, however, most are able to come to terms with their sexual orientation.

When adolescents are confronted with making decisions about dating and sex, they often rely more on friends than parents as a source of information and influence. Peers, unfortunately, do not always provide correct or thorough facts about sex. In addition, adolescents are just starting to develop formal operational reasoning, which means they are just starting to think about all of the possible consequences for their behavior. Adolescents tend to focus on the immediate situation instead of the long-term consequences of their behavior. So, they may think mostly about what the sexual experience will be like, and not the possibility of becoming pregnant or getting a sexually transmitted disease. Adolescents also assess their own personal risk incorrectly and may see themselves as personally invincible against the risks associated with unprotected sex. American teenagers are less likely than teenagers in other industrialized countries to use birth control, and even when they do, they are less likely to use effective methods.

About 1 million teenagers become pregnant every year in the United States (although only about half actually give birth). This rate is much higher than for other industrialized countries. This difference seems to be connected to Americans' attitudes toward premarital sex. Sex education is much less common in the United States than in other countries. In addition, programs in the United States are more likely than in other countries to focus on abstinence or delaying intercourse as methods of birth control. However, sex education programs seem to have little effect on whether or not adolescents choose to engage in sexual activity.

Babies of adolescent mothers are at risk for a number of problems during pregnancy and childbirth. They are more likely to be born prematurely, to be of low birth weight, or both. They are also more likely to die within the first year. Adolescent mothers are more likely to drop out of school and are less likely to catch up on their education later compared with women who waited to have children. As a result, adolescent parents are more likely to have low-paying, low-status jobs or to be unemployed. As for their children, they are more likely to have poorer cognitive and social functioning in school. They are more likely to have learning and adjustment problems in adolescence, including problems with delinquency, dropping out, and drug use. They are also more likely to become teenage parents themselves.

So what can be done to reduce the rates of adolescent pregnancy? One approach that shows some promise combines providing information regarding sex and pregnancy in schools with access to community health care services that offer contraception. However, parents often object to such programs, and at best they are helpful only for those adolescents who take advantage of them. As with drug education programs, interventions that target the family and community as well as the individual are most likely to be successful.

SUMMARY

Peer relationships are one of the most influential in children's lives. Peers may be friends or foes, may support us or attack us, and may lead us toward more optimal or less optimal developmental outcomes. In most cases, peers help us learn to play, to develop intimacy, to know ourselves, and to make decisions that will shape the rest of our lives.

—Heather A. Holmes-Lonergan

See also Peer Pressure, Social Development

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PERMISSIVE PARENTING STYLE

"Parenting styles" are simply one way to think about and classify the many differences from family to family in how parents go about rearing their children. Diana Baumrind, in the early 1970s, formulated a categorization scheme for parenting styles that is still used today. Parenting style is determined by an analysis of where along a continuum of two parenting dimensions a person falls—warmth and control. Warmth is the degree to which parents are understanding, compassionate, and responsive to their children's physiological and psychological needs. Control is the degree to which parents are involved in regulating children's behavior through the provision of goals, expectations, behavioral standards or rules, and discipline and authority. Parenting that incorporates high levels of warmth and high levels of control is classified as authoritative. Parenting characterized by high control and low warmth is labeled authoritarian. Parenting that reflects low levels of warmth and low levels of control is often called neglectful. And finally, the topic of this entry, parenting that involves a high level of warmth and affection but low levels of control, is considered permissive (or indulgent) parenting.

Permissive parents tend to let their children make their own decisions while providing little direction and few boundaries. These parents also tend to provide minimal or inconsistent discipline when their children misbehave. These parents often have relationships with their children that resemble friendships, with little authority being held by the parents. Although this style of parenting provides much love and nurturance, it calls for children and adolescents to make many decisions about the structure and goals of their lives and their behavior, decisions that youngsters are often not mature enough to make.

Although this entry discusses parents in terms of categories or types, parents labeled as permissive are not necessarily permissive all of the time—there is certainly variability in parenting depending on the situation, but this situational variability is centered around an "on-average" permissive style. Different children can also elicit different parenting practices. The parent-child dynamic is highly transactional, such that the parent influences the child and the child influences the parent. One style might work best with a certain child, whereas a different style might be good for another.

Permissive parenting, on the whole, is not associated with positive outcomes for children, mostly because research shows that children need a fair amount of structure, rules, and boundaries. Children from very permissive homes often have poor behavioral self-control and tend to be disobedient, impulsive, and aggressive compared with children from authoritative and authoritarian families. Lacking appropriate parental guidance, children raised permissively tend to have trouble understanding what behaviors and responses are appropriate. Permissive parenting has also been linked with children's poorer performance in school compared with the other parenting styles. Lack of structure and consistent discipline at home often lead children to exhibit behavior problems in the classroom that also get in the way of academic progress. Adolescents who have been reared in a very permissive manner are more likely than others to engage a variety of at-risk behaviors, such as drug and alcohol use and sexual promiscuity.

Although deficits in child behavioral control and academics have been associated with permissive parenting, children of permissive parents tend to have relatively high self-confidence, are generally sociable individuals with many friends, and tend to have warm relationships with their parents and others, at least compared with children of authoritarian parents. The lesson learned is that children need more than just love to develop to their full potential. Children benefit greatly from parents setting appropriate limits as well.

—Beau Abar and Adam Winsler

See also Baumrind, Diana; Parent-Child Interaction

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PERRY PRESCHOOL PROGRAM

THE HIGH/SCOPE PERRY PRESCHOOL STUDY

The High/Scope Perry Preschool Study began in Ypsilanti, Michigan, in 1962. The study assesses the effects of preschool education on low-income African American children considered at high risk for school failure. The preschool program was operated by the local public schools. The program director was the school district's special education director, David Weikart, who subsequently founded the High/Scope Educational Research Foundation to continue the longitudinal study.

The program provided classes 2½ hours per day, 5 days per week for 30 weeks per year. Groups of 20 to 25 children were assigned to four public school teachers. Teachers also made weekly home visits. The curriculum emphasized active learning. Children planned and reviewed their educational activities daily. Substantial class time was devoted to a balance of teacher-directed and child-initiated activities.

Children entered the study at age 3, with the exception of one cohort who began the first year at age 4. One hundred twenty-eight children were randomly assigned to the preschool program or to a control group with minor exceptions (e.g., younger siblings were assigned to the same group as the first child in a family to enter the study). All children entered public kindergarten at age 5. Data on intelligence quotient (IQ), achievement, and behavior were collected every year from ages 3 to 11, and additional data collections took place at ages 14, 15, 19, 27, and 40. Social and economic outcomes assessed include education, employment, earnings, crime, social services assistance, and family formation.

Key Results

Preschool children experienced a boost in IQ during the preschool years and up to age 7. Effects on achievement and school progress were more durable. The preschool group had higher achievement test scores at age 14, higher high school grade point averages (2.09 vs. 1.68), lower rates of classification as mentally impaired (15% vs. 34%), and higher high school graduation rates (71% vs. 54%). At age 27, they had fewer arrests, were more likely to own a home (36% vs. 13%), had higher monthly earnings, and were less likely to have used social assistance as adults (59% vs. 80%). Many of these effects translate into economic benefits that include cost savings to society and financial benefits to participants. Despite home visitations and the collection of a wide range of family outcome measures, no direct effects were found on parents or the home environment. Benefit-cost analysis finds that the program returned at least $9 for every $1 invested in the program (discounted at 3%), or an internal rate of return of about 16%.

Implications

The Perry study was among the first to demonstrate the effects of intensive preschool education on disadvantaged children over the life course. The study is limited by the small sample size, specifics of the population served, program design, time, and locale. However, many studies have replicated the short-term results, and several have produced similar long-term results. Among these is the Abecedarian Project, another randomized trial in which an intensive birth-to-5 education was found to produce very large long-term educational gains for disadvantaged children.

—W. Steven Barnett and Leonard N. Masse

See also Abecedarian Research Project, Early Intervention Programs

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PERVASIVE DEVELOPMENTAL DISORDERS

The broad diagnostic category of pervasive developmental disorders (PDDs), now often called autistic spectrum disorders (ASDs), encompasses several related yet distinct disorders, including autistic disorder, childhood disintegrative disorder, Rett's disorder, Asperger's disorder, and pervasive developmental disorder, not otherwise specified. The ASDs are characterized by significant and pervasive impairments in several areas, including social interaction skills, communication abilities, and the presence of restricted and repetitive behaviors, interests, or activities. These impairments are atypical relative to the individual's developmental level, usually appear early in life, and are often associated with mental retardation.

AUTISTIC DISORDER (AUTISM)

Autism is characterized by significant impairments in social interaction and communication as well as restricted and stereotypic patterns of behavior, interests, and activities (e.g., resistance to change, repetitive nonfunctional motor mannerisms, and preoccupation with parts of objects). Additionally, unusual responses to the environment (e.g., insensitivity to pain, over-reactivity or under-reactivity to noise) may be present. Social deficits include impairments in the use of multiple nonverbal communicative behaviors (e.g., eye contact, use of gestures), reduced awareness of others, inability to form appropriate relationships, failure to spontaneously share enjoyment and experiences, and lack of social and emotional reciprocity (e.g., not actively participating in social games; not noticing another's distress).

Language comprehension is significantly impaired (sometimes worse than expression) in people with autism, and nearly half are never able to communicate verbally. Those with verbal skills often have odd intonation, reverse pronouns, make up terms (neologisms), rarely use idioms correctly, and may repeat phrases heard on previous occasions (echolalia). Individuals without functional spoken language can benefit from training in the use of sign language, picture exchange, or other forms of augmentative communication (e.g., computers). Pretend play, imitation, and joint attention (seeking attention for the purpose of sharing interest or pleasure) are also impaired.

Both the cognitive deficits and behavioral sequelae of autism can range from mild to severe. Some individuals engage in disruptive behaviors, including self-injury, aggression, and property destruction. Most adults with autism require varying degrees of caregiver support throughout their lives; only a minority of autistic adults achieve independent living. The two most common predictors of better outcome in people with autism are higher intelligence quotient (IQ) and greater functional language.

Recent prevalence estimates range as high as 60 in 10,000 individuals. The disorder is four to five times more common in males, although females are more likely to exhibit more severe mental retardation. Because there is a genetic component in the development of autism, there is an increased risk (3%–10%) for the disorder in siblings of affected people and an even higher risk for partial forms of the disorder appearing in siblings. Although several environmental factors, such as toxins and vaccination, have been suggested to cause autism, there is no evidence supporting this. Neuropathological and neurochemical studies suggest a wide range of possible abnormalities, with the most consistent evidence focusing on the serotonin system (neurochemically) and the limbic system (anatomically).

CHILDHOOD DISINTEGRATIVE DISORDER

Childhood disintegrative disorder (CDD) is probably the rarest and least understood of the ASDs. CDD occurs when a child develops typically for at least 2 years before experiencing a marked overall decline in previously learned skills. Some early signs that may be present before skill regression include irritability, anxiety, increased activity, and a loss of interest in the environment. The decline in skills occurs before the age of 10 (usually between the ages of 3 and 4) and results in significant impairment in the areas of play skills, language, social skills, and adaptive behavior. Additionally, children with CDD may develop stereotypies (nonfunctional repetitive motor or vocal behaviors) and restricted interests. Many individuals with CDD exhibit disruptive behaviors, including aggression and self-injury. The overall presentation of children after regression is nearly indistinguishable from children with autism, and the prognosis is usually poor. Children usually function in the severely mentally retarded range and are at higher risk for developing seizures. Often, subtle neurological impairments and abnormalities are present.

Although a specific cause has not been found, it appears as though CDD occurs as the result of damage to the developing brain. Prevalence data are lacking, although CDD may be underdiagnosed because of the symptom overlap with other ASDs, including Rett's syndrome and autism, as well as degenerative neurological disorders. It is important to conduct a thorough medical and neurological examination to rule out other causes of the developmental regression. This is especially important when regression occurs at a later age (e.g., after age 5). Additionally, individuals with CDD should be monitored closely for seizure disorders. Epidemiological data are limited, but recent data suggest that CDD is more common in males. CDD is a lifelong condition, although the loss of skills usually stabilizes, and some limited improvement occurs.

RETT'S DISORDER

Rett's disorder (also called Rett's syndrome) is a severe neurodevelopmental disorder primarily affecting females that impairs all aspects of development. It causes severe to profound mental retardation, severe communication impairment, loss of functional hand use and other physical disabilities, and impaired social skills, as well as medical problems such as seizures, feeding difficulties, cardiac abnormalities, scoliosis, and autonomic nervous system dysfunction. With an estimated prevalence of 1 in 10,000 to 15,000 female births, it is among the most common causes of mental retardation in young girls. A major research advance came in 1999 when a specific genetic abnormality was identified in most girls with Rett's syndrome. This gene *(MECP2*) encodes for a protein that plays a role in the regulation of gene expression and is found on the Xq28 region of the X chromosome.

Rett's syndrome is unique among the ASDs in that stages of illness progression have been delineated. The first stage begins after a period of typical development that generally lasts between 6 and 18 months. During Stage 1 (early-onset stagnation), deceleration of head growth and reduced interest in playing become apparent. In addition, the appearance of odd hand-waving behaviors and reductions in eye contact and language abilities may be observed. Severe regression occurs in Stage 2 (developmental regression), which occurs between 1 and 4 years of age. In this stage, the characteristic hand-washing or hand-wringing behaviors result in a loss of hand skills; gross motor impairment and clumsiness are present; the ability to speak is lost; and the capacity to understand language is seriously impaired. Furthermore, cognitive abilities deteriorate, breathing is often irregular, seizure activity often begins, and episodes of laughing during the night may occur. It is during this stage that symptoms may mimic those of autistic disorder, and thus differential diagnosis can be challenging.

The onset of stage 3 (pseudostationary period) is variable. During this time, skills do not deteriorate as much, and the girls begin to interact more with their environments. Although not able to communicate verbally, many with Rett's syndrome are able to make basic communicative efforts using eye gaze and intense staring. Gross motor skills continue to deteriorate, seizures are common, and this period usually lasts years to decades. Stage 4 (late motor deterioration) is typified by complete loss of the ability to walk and increased physical rigidity. Severe scoliosis and progressive muscle wasting are characteristic, and most individuals must use wheelchairs by adulthood. However, seizure activity tends to decrease, the deterioration of cognitive abilities stabilizes, and contact with others improves.

ASPERGER'S DISORDER

Asperger's disorder (or Asperger's syndrome) is characterized by significant and long-standing impairments in social interaction, restricted and repetitive activities and interests, and stereotyped behaviors. Unlike individuals with other ASDs, those with Asperger's syndrome do not display clinically significant delays in language or cognitive development. Because of typical (or nearly typical) cognitive and language development, Asperger's syndrome is often not diagnosed until the late preschool or early elementary school years when social deficits become more apparent. People with Asperger's have narrow interests (e.g., clocks, hotels, or train schedules) with which they are single-mindedly preoccupied to the exclusion of other developmentally appropriate activities. These restricted interests often interfere with social and academic development. For example, individuals with Asperger's often attempt to engage others in conversation related to these stereotyped interests without regard for the other's interest in the topic.

Individuals with Asperger's syndrome generally excel in academic subjects that entail rote memorization but tend to fare more poorly in tasks requiring

flexible thinking, creativity, and higher-order cognitive processes such as abstract thinking. Similarly, these individuals tend to apply social rules in a rote manner and evidence a strict adherence to routines. Anecdotally, people with Asperger's syndrome are clumsy or physically awkward and often have difficulty with tasks that require fine motor abilities such as writing.

People with Asperger's often have a distinctive vocal quality characterized by overly formal speech, atypical prosody, and reduced use of gestures. Furthermore, these individuals have difficulty interpreting nonverbal cues (e.g., diverted gaze as indicative of loss of interest) and the more subtle nuances of language. Additionally, an overly literal interpretation of language that results in a lack of understanding of idioms, common expressions, and the like is generally found. Appropriate pragmatic language skills (e.g., eye contact, body proximity during conversation, and appropriate social greetings) are often lacking. Together, these impairments result in social difficulties, peer rejection, and alienation. People with Asperger's are typically aware of their social deficits and may make unsuccessful efforts at social contact, which can result in distress and elevate risk for the development of affective disorders such as depression.

Asperger's syndrome is diagnosed at least five times more frequently in males, and there is often a family history of social difficulties or other ASDs. As Asperger's syndrome has come to be more widely recognized among clinicians and parents, controversy has arisen surrounding accurate and appropriate diagnosis. Some professionals tend to loosely apply diagnostic criteria, and many in the field think that this condition may be overdiagnosed. Thus, reliable prevalence data are currently unavailable. In addition, questions exist regarding how Asperger's fits into the autism spectrum and whether it is actually distinct from high-functioning autism (HFA). Differential diagnosis is complicated by the fact that there is symptom overlap with other disorders (e.g., schizoid and schizotypal personality disorders, nonverbal learning disability, and attention deficit hyperactivity disorder), although there are separate and unique diagnostic criteria that should differentiate Asperger's from these other conditions.

A better prognosis is associated with Asperger's than with the other ASDs because these individuals do not have the cognitive impairments or communication deficits that are associated with autistic disorder, Rett's disorder, and childhood disintegrative disorder. People with Asperger's syndrome may be able to pursue careers related to their restricted interests, although they often fail to achieve occupational status commensurate with their level of cognitive and academic functioning.

PERVASIVE DEVELOPMENTAL DISORDER, NOT OTHERWISE SPECIFIED

A diagnosis of pervasive developmental disorder, not otherwise specified (PDD-NOS) is indicated in individuals presenting with significant impairments in social interactive skills in conjunction with one or both of the following: (1) verbal or nonverbal communication deficits; and (2) stereotyped behavior, interests, or activities. This category includes "atypical autism," or symptom presentations that do not meet full diagnostic criteria for autistic disorder. Clinically, the PDD-NOS diagnosis is often applied rather liberally and inappropriately in cases in which a diagnosis of various behavior disorders, mental retardation, autistic disorder, or one of the other ASDs would be more appropriate.

TREATMENT INTERVENTIONS

Interventions include the use of applied behavior analysis to teach academic, self-care, and adaptive skills and to reduce disruptive behavior. People with autism learn best when skills are broken down into small steps, when provided with many opportunities to practice skills, and when success is rewarded. They may need additional assistance in generalizing skills to different environments. Children with ASDs benefit from structured interactions with their typically developing peers. In individuals without functional spoken language, the use of alternative communication methods such as sign language or picture systems, including the Picture Exchange Communication System (or PECS), is recommended. For some people with autism, medications may be beneficial in reducing disruptive behaviors and stereotypy; improving attention, mood, and sleep; and reducing anxiety and depression, although they are generally considered not to address the core social and communication symptoms. In addition, parents and physicians should be aware of the higher risk of seizure disorders in this population. Parents and professionals should also be

cautious when considering unproven interventions. Because the PDDs are severe and not well understood, myriad nontraditional treatments have been introduced, including chelation, facilitated communication, special diets, and secretin. The effectiveness of these interventions is questionable, and some may be harmful.

—Hilary C. Boorstein, Deborah A. Fein, and Leandra B. Wilson

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PESTICIDES

Pesticides are chemicals used to eliminate animals or plants that are hazards to crops, homes, or health. Rodenticides, herbicides, insecticides, and fungicides all have potential toxicity to nontarget organisms. All pesticides are an acute poisoning hazard, but rodenticides pose the highest risk for children because they are often placed where they are readily accessible.

Most people in industrialized countries are exposed to insecticide, herbicide, and fungicide residues in food, air, and dust. Because children consume more food per body weight and have a higher respiration rate than adults, they are likely to absorb larger amounts of pesticides per body weight compared with adults. Children from families in which at least one member works in agriculture have higher pesticide exposure than comparison groups. Farm workers may carry home residues on their clothing, bodies, and vehicles. Where families live in close proximity to fields, exposure can occur from drift from spraying operations in the fields. Urban areas with substandard housing also have high pesticide application rates and high human exposure. In contrast, children from families that eat predominately certified organically grown foods have the lowest pesticide exposure of any segment of the population.

As yet there have been no prospective longitudinal studies of the behavioral effects of pesticides on either children's development or the processes of aging. However, nicotine was formerly used as a pesticide, and its mode of action in the nervous system has similarities to some currently used insecticides. Longitudinal studies show that children whose mothers smoked while pregnant score lower on tests of verbal skills, show higher activity levels, perform worse on tests of attention, show higher rates of aggression as adolescents, and have a higher risk for violent criminal acts in adulthood. These findings raise the importance of carrying out longitudinal prospective studies of pesticide exposure, given the similarities in the mechanisms of nicotine and some insecticides.

Cross-sectional studies of the behavioral effects of pesticides on humans have been of limited scope. In a farming community of heavy year-round pesticide use in Mexico, children showed deficits in fine motor coordination, long-term memory, physical stamina, and the Draw-a-Person Test compared with children from an adjacent area without heavy pesticide application. Pesticide applicators score worse on vocabulary tests and report more subjective symptoms such as memory and mood problems, fatigue, irritability, and headaches compared with nonapplicators of similar education and background.

Most insecticides disrupt aspects of neurotransmission. Some neurotransmitters function as gene signaling chemicals during brain development. Therefore, altering the concentrations of neurotransmitters can have serious effects on brain development. Knowledge about the effects of early pesticide exposure on brain development comes from animal research using higher dosages than those to which most people are exposed. Nevertheless, findings show important effects on the development of the mammalian nervous system. For example, dichlorodiphenyltrichloroethane (DDT, a pesticide that is now

banned from use in the United States and other industrialized nations) administered early in life can permanently alter the development of the cortex in rodents. DDT also resulted in delayed walking, rearing, and lower overall motor activity. When given to rats early in development, methyl parathion, an organophosphorus pesticide commonly used in farming, caused worse performance on spatial memory tests, reduced the number of cholinergic receptors in the brain, and produced lesions in the hippocampus, an area of the brain that influences memory. Administering chlorpyrifos, also an organophosphorus pesticide, to pregnant rats yielded offspring that showed worse righting reflexes, delayed cliff avoidance, and fewer cholinergic receptors in the brain. Extrapolating from studies of rodents to humans requires many assumptions—hence the need for human epidemiological studies of pesticide effects remains.

—Colleen F. Moore

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PETS

Archeological findings indicate that animals have coexisted with humans and played significant roles in their lives for thousands of years. The first cohabiter was the wolf (*Canis lupus*), the predecessor of the domestic dog. Next came horses, asses, camels, water buffalo, alpaca, llama, turkey, guinea pig, cats, and domestic fowl. The Greeks purchased toys for their pets and embalmed their dead cats to bury them later with the owner. The English monarchs James I, Charles I, Charles II, and James II were avid dog keepers. The Chinese Emperor Ling named his dogs as senior officials of the court, whereas the rulers of the Ming dynasty honored cats. Later, the Manchurian LCh'ing dynasty named the Pekingese dog as the preferred pet, and it was common for women to breast-feed puppies along with their children. The Japanese and Koreans were passionate about dogs. Shogun Tsunayoshi was frequently referred to as the Dog Shogun because of his obsession with them.

When Hernandez arrived in Mexico, he found raccoons living with people. Raccoons were also favorites of California Indians. North American Indians kept moose, young bison, calves, wolves, and bears. The West Indies and Jamaican people kept dogs similar to Maltese lap dogs. Just as Manchurian women did, Jamaican women breast-fed dogs and children at the same time. Likewise, South America Indian mothers suckled dogs, monkeys, opossum-rats, deer, and birds along with their own children.

PSYCHOLOGICAL AND PHYSICAL BENEFITS OF PETS

Pets have been shown to reduce loneliness in young women, elderly people, and homeless individuals and also to reduce stress. Pets also increase social interactions among elderly individuals. People with pets experience reduced risk for heart disease, lower blood pressure and heart rates, and increased survival rates after an illness. Australian cardiologists found that pet owners had lower blood fat levels and lower cholesterol, triglycerides, and blood pressure. Watching aquariums filled with fish results in reduced anxiety, stress, and blood pressure.

Equine-assisted therapy has been used successfully to rehabilitate various disorders, including language, physical, emotional, and social. Hippotherapy, the term applied to the use of horses for physically disabled people such as quadriplegics and multiple sclerosis patients, develops better muscle coordination. Emotionally disabled individuals experience increased self-confidence by mastering riding skills.

THERAPEUTIC ROLE OF PETS

Children

Boris Levinson, a child psychologist, noticed that children with emotional problems were more willing to interact with his dog Jingles than himself. He built

on this wordless interaction by joining in the game and directing his attention to the dog rather than the child. Once able to trust the dog, the child was in a better psychological position to transfer trust to a human adult. Based on these findings, the effects of pets on emotionally disabled and mentally retarded adolescents in a special education classroom were examined. After weekly visits over 4 months, the students exhibited reduced aggression and increased interaction among their peers.

Adults

Mentally disabled individuals in institutional settings benefited from interaction with pets. After spending time with an animal in therapy sessions, walking outside on the hospital grounds, and interacting in the ward, the patients who did not respond to conventional treatment became less withdrawn, showed improved communication, and reported feeling happier because of their association with the animals. The presence of birds in a psychiatric hospital resulted in significantly lower hostility scores, increased feeling of safety, and more openness among the patients.

When dogs accompany their human companions on walks, their presence increases the probability of social interactions with others. Furthermore, dogs provide a social reference for friendly gestures and communication.

Prisons

Correctional facilities have found that animals enhance the social interactions of inmates, reduce fighting, and eliminate suicide attempts. Inmates in Virginia who were given birds, fish, and small mammals as pets had significantly lower blood pressure when talking to the pet as opposed to talking to people. The Mansfield (Ohio) Correctional Institution matched inmates with a "death row dog" (dogs that were 1 day away from euthanasia at local animal shelters). The inmate was given the responsibility of training the dog and preparing it for adoption. After working with the dogs, the men reported increased compassion for others, decreased anxiety, improved social interactions, and a greater motivation to complete high school. Women inmates at the Lexington (Oklahoma) Correctional Complex and in Gig Harbor, Washington, adopt dogs from animal shelters and train them for elderly and handicapped citizens. The women report improved attitudes, better self-images, and increased caring for others. Three women inmates at the South Australian Department of Correctional Services were given complete responsibility for the care and training of nine dogs. They indicated that the program enhanced their self-esteem, increased calmness and happiness, and lessened aggression and aggravation.

CHILDREN AND PETS

Pets teach responsibility and reproduction to children. They are also important play partners during middle childhood. Second- and fifth-grade children in the United States described their pets as playmates. German fourth graders played, talked with, and showed daily affection toward their pets. Playing with pets provides a safe environment for children to experiment with their own cognitive exploration and development. For example, children practice language and problem-solving skills on the pets before extending them to their peers. Children between the ages of 9 and 12 years exhibit higher self-esteem as a result of the playmate status of the pet. In addition, pets teach young children how to take care of another living being. Boys have been shown to learn important nurturing skills by interacting with their pets.

Ninety-nine percent of veterinary clients talk to their dogs and cats, whereas eighty percent admit to talking to their pets in the same manner as they talk to other humans. About 70 percent of horse-owning adolescents report telling their horse their problems during the course of grooming it in the solitary confinement of the barn. Eighty-four percent of Scottish children reported that they talked to their pets, and 65 percent believed the pets comprehended the meaning of the conversation. Fifteen percent of Swedish elderly people considered their pet their most significant social contact.

CHOOSING A PET

Animals besides dogs and cats make good pets; gerbils, parakeets, chickens, iguanas, fish, and rabbits are among those animals kept as pets. The important aspect of choosing a pet is determining both the animal's and the human's welfare. The pet owner must be able to provide proper nutrition, veterinary services, and appropriate shelter for the animal.

PET LOSS AND GRIEF

Humans throughout history have grieved over the death of pets. For example, early Egyptians shaved their eyebrows when their cats died, whereas early Romans built tombs to honor their dead pets. More recently, nearly 90% of all veterinary clients exhibited symptoms of grief on the day of a pet's death. Most of the symptoms, such as moderate depression and crying, lasted a week following the death. On the day of the death, pet owners report uncontrollable crying as the most often experienced behavior. After the loss of a pet, most people experience grief, denial, a sense of loss, numbness, and anger. Friends have been found to be more important sources of support than family members.

After natural disasters, many people lose pets. During the largest tornadoes in Oklahoma history in May 1999, many families lost all of their pets and livestock. Those with a close attachment to their pets reported feeling a greater loss than those with low to moderate attachments. In addition, the grief was often more intense in the older owners and those owners who lived alone or with other adults. Although most people adopt another animal after the death of a beloved pet, they also report that they view all pets as individuals and, like children, irreplaceable.

Germans are extremely adamant about honoring the lives of all pets. For instance, residents and visitors alike are required to pay for any animal killed by their automobile. In addition, the local veterinarian estimates the potential number of future offspring the animal could have produced, and the individual must pay monetary damages for these unborn offspring.

—Sherril M. Stone

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PHENOTYPE

A phenotype is any distinctive structural or functional trait or set of characteristics expressed by an organism. Structure may be observed at any level, including external or internal gross anatomy and organ or tissue histology. Function may be observed at the level of cell biology, tissue biochemistry, organ physiology, or behavior of the whole organism. Phenotypes are used to define and classify individuals and groups in scientific studies and medical practice.

A phenotype may be a single observable characteristic or trait, or it may refer to a combination of traits. Diseases, syndromes, and malformations are clinical phenotypes. Examples of laboratory phenotypes include serum protein electrophoretic patterns, enzyme activities, and metabolite levels. An electrophysiologic response to nerve stimulation could be considered a clinical or laboratory phenotype. A pattern of gene expression detected on a DNA microarray would be a molecular phenotype.

Phenotypes result from interactions involving products of gene expression, the environment, and chance. Sickle cell disease is an autosomal recessive disease phenotype, but sickling of red cells is an autosomal dominant laboratory phenotype caused by deprivation of oxygen on a microscope slide. The disease phenotype of emphysema can be caused by the combination of a genetic predisposition such as

alpha-1-antitrypsin deficiency and an environmental exposure such as smoking. Skin cancer is caused by both familial predisposition and sun exposure. A striking example of environmental influence on a structural phenotype is the phenomenon called temperature-dependent sex determination. Atlantic sea turtle gender is determined by ambient temperature during the midportion of incubation. Females are produced at warmer temperatures, whereas male hatchlings are more prevalent in cooler temperatures. When the temperature is in the range of 28° and 30°C, the sex ratio is approximately 1:1.

Chance is involved in the expression of phenotypes. Kurnit and colleagues used computer modeling to show that concepts such as "reduced penetrance" and "multifactorial inheritance" can be accounted for by chance. Their stochastic, probabilistic model demonstrated that incomplete penetrance of phenotypic expression can be due to genes that *predispose* an organism to develop a trait, but do not always cause an abnormal phenotype.

Major clinical features have significant medical, surgical, functional, or cosmetic consequences, whereas *minor* clinical features do not have important detrimental implications. Minor features can be important in defining phenotypes. Iris Lisch nodules are of no functional significance to a patient, but they are specific for the diagnosis of neurofibromatosis type I and provide an important marker for affected individuals. Some recognizable phenotypes such as Down syndrome are defined by their pattern of minor features rather than major features.

Phenotypic traits such as height, blood pressure, head circumference, and intelligence quotient (IQ) are *continuous*. They can be quantified, with measurements distributed in a continuous fashion across a population. Conversion of continuous traits into *discontinuous* ones can be achieved by defining a "threshold." For the examples above, thresholds could be used to define phenotypes of short or tall stature, low blood pressure or hypertension, microcephaly or macrocephaly, and mental retardation or genius status.

Accurate phenotype definition and delineation is important in gene-mapping studies. In fact, what we currently refer to as gene mapping is actually *phenotype mapping*, with the identification of new gene loci merely a by-product of our current ignorance about the human genome. Even after all loci in the human genome have been identified, there will still remain huge gaps in our knowledge about correlations between genotypes and phenotypes.

Mapping studies may be aided by the use of *endophenotypes* or *subphenotypes*, biological markers that characterize complex or poorly defined syndromic phenotypes. These may be presymptomatic risk factors. For example, brain magnetic resonance imaging findings or physiologic test responses characteristic of psychiatric disease may be used in family studies to identify presymptomatic relatives who carry the same genetic predisposition.

Mapping studies may also use broadened phenotypes for conditions that are usually nonfamilial. For example, instead of studying the genetics of autism using only subjects with an established diagnosis, investigators have benefited by also including relatives with related neuropsychiatric traits.

The term *phenotypic heterogeneity* can be used to refer to the phenomenon wherein disparate clinical phenotypes are produced by alleles at a single gene locus. Numerous examples of this now exist in the human genome, where disorders previously thought to be different entities are caused by mutations at the same locus.

—Arthur S. Aylsworth

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PHENYLKETONURIA (PKU)

Phenylketonuria (PKU) is an inherited metabolic disorder in which the amino acid phenylalanine cannot be broken down by the body. As a result, unhealthy levels of phenylalanine accumulate, causing a variety of problems, including mental retardation.

Fortunately, doctors can test for PKU at birth, and the negative effects can be prevented with a diet low in phenylalanine.

About 1 of every 10,000 babies is born with PKU. PKU is most common in whites of Northern European ancestry. It occurs less frequently in babies of African and Asian descent. PKU occurs in infants who inherited two copies (one from each parent) of a mutated gene for phenylalanine hydroxylase *(PAH)*. The mutated *PAH* gene, which is found on chromosome 12, is carried by about 1 in 50 people. If two carriers have a child, there is a 25% chance that they will have a child with PKU. If the inherited *PAH* genes are mutated but in different ways, a mild form of PKU may develop.

PAH is responsible for metabolizing phenylalanine in the body. Specifically, after a person eats a food containing phenylalanine, *PAH* turns the phenylalanine into another amino acid, tyrosine (which is used by the body for a variety of purposes). The genetic mutation associated with PKU causes the body to produce insufficient amounts of *PAH* or none at all. As a result, phenylalanine cannot be metabolized, and dangerously high levels build up in the blood and brain. These high levels lead to the signs and symptoms associated with PKU.

Newborns with PKU do not show obvious signs of high phenylalanine levels. However, within a few months, the symptoms are apparent. PKU causes irreversible brain damage, resulting in a variety of problems, including mental retardation, seizures, microcephaly (small head size), stunted growth, hyperactivity, and behavioral problems. Children with the mild version of PKU show similar symptoms, but they tend to be less severe.

Fortunately, the symptoms of PKU are preventable. Infants who are born in a hospital are tested for PKU before they go home (babies born outside of the hospital should be tested as soon as possible after birth). Once detected, prevention of the symptoms can be accomplished through dietary restrictions. Some phenylalanine is necessary for proper growth and functioning; however, the special diet of phenylketonurics (people with PKU) limits intake of phenylalanine to about 10% the normal amount. Phenylalanine is found in high quantities in protein-rich foods, including breast milk, dairy products, beans, eggs, meat, and fish; therefore, people with PKU have to avoid these substances entirely. The artificial sweetener aspartame also contains high quantities of phenylalanine and must be avoided; for this reason, diet soda bottles and cans include a warning to phenylketonurics that the product contains phenylalanine. Many other substances contain smaller quantities of phenylalanine and may be consumed by people with PKU, as long as the recommended daily amount is not exceeded. In addition to the dietary restrictions, phenylketonurics typically have to drink a high-protein, phenylalanine-free formula that provides many of the essential nutrients that the person would otherwise be lacking.

For newborns with PKU, a diet low in phenylalanine is necessary to prevent brain damage; the restricted diet is particularly important in the first few years of life. After successful treatment for PKU early in life, some adults choose to go off of their special diet. However, most doctors today recommend sticking with the diet for life. It is particularly important for women with PKU to maintain a restricted diet during the childbearing years. High phenylalanine during pregnancy (known as maternal PKU) increases the risk for miscarriage and produces irreversible brain damage in 90% of newborns. Because the child often does not inherit PKU, a special diet after birth does nothing to reduce or prevent symptoms.

Since Asbjorn Folling first described PKU in 1934, researchers have learned a lot about this disorder. Recently, experiments have used mice models of PKU to find better treatments. Researchers hope to eventually find a way to prevent the genetic mutation that causes phenylketonuria.

—Kristine M. Jacquin

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PHOBIAS

Phobias represent a part of the anxiety disorders spectrum in which the primary symptoms include physiological arousal, cognitive appraisal of impending harm, and avoidance of discrete stimuli and situations associated with the stimuli. Although there are numerous popular descriptors for phobias (i.e., arachnophobia for fear of spiders), the technical term in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* lists all phobias under the label of *specific phobia*. Within this diagnosis, there are five subtypes: animal, natural environment, blood-injection-injury, situational, and other. Blood-injury-injection phobia is the only subtype with lowered psychophysiological arousal when confronted with the stimuli, leading to increased risk for fainting and loss of muscle tension.

CAUSE AND PREVALENCE

There is no widely agreed on cause of phobias. However, most theorists have agreed that the origins of phobias are based on cognitive and behavioral principles. On the one hand, aversive learning experiences with the phobic stimuli have been considered an important factor in the development of phobias (as is frequently the case in fear of choking, for example). Yet there are many cases of phobia that have no etiological cause that can be readily identified (i.e., blood-injury-injection phobia). A recent theory that addresses this inconsistency is the nonassociative account of phobias. Essentially, this theory posits that individuals who are dispositionally prone to certain phobias may have environmental contingencies that more readily lead to the development of phobias, whereas in the absence of maintaining factors, phobias do not persist. Poulton and Menzies (2002) describe, as an illustration, the finding that most individuals with a fear of water demonstrated extreme anxiety for water at very early ages. In the absence of any learning history that would support this fear (indeed, it would be expected that very young children would have low apprehension regarding water), this is considered supportive, at least in part, for a nonassociative account.

It is estimated that about 11% of the population meet criteria for a specific phobia, as defined by the *DSM*. However, "despite the fact that specific phobia is a common, treatable, and well-understood condition, people with specific phobia rarely present for treatment" (Antony & Barlow, 2002, p. 380). One reasonable explanation is that most phobias do not lead to functional impairment. For example, in most situations, spider phobia does not lead to problems in living or sufficient distress that the sufferer would require treatment.

Although most individuals with specific phobias do not seek treatment for these problems per se, when treatment is initiated, there is a high success rate. Efficacious treatment for specific phobias primarily involves behavioral therapy, typically involving graded exposure in vivo to the stimuli. In some instances, exposure *in imagery* may be used as an additional means of reducing fear, or as a means of initiating treatment on the way to live exposure. For some types of phobias, effective outcome has been obtained in a single prolonged session (i.e., injection phobia). In some cases, it has been observed that adding cognitive therapy (e.g., positive self-statements or challenges to maladaptive beliefs) contributed to efficacy and enhanced long-term outcome.

Although the efficacy of cognitive and behavioral treatment has been established for phobias, some phobias are difficult to treat with exposure in vivo because of logistical constraints. For example, fear of flying ultimately requires taking a flight. The disadvantages of this involve cost, scheduling, and lack of control over the rate of exposure by the therapist. As a means of circumventing this problem, virtual reality treatment has been developed to address the problem of exposure for phobic stimuli that are difficult to treat with in vivo exposure methods. This form of treatment has been found effective for fear of flying and acrophobia.

—Dean McKay and Steven D. Tsao

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PHONICS

Phonics is a method of reading instruction that focuses on teaching students the sounds associated with letters and letter combinations. For example, when kindergartners are taught that the letter *c* says */c/* as in candy, *a* says */a/* as in apple, and *t* says */t/* as in tiger, and are later prompted to blend the sounds */c/ /a/ /t/* into "cat," they are learning to read with phonics. Because phonics unlocks word identification and a cascade of associated benefits, including fluency, spelling improvement, and comprehension, it has become, in recent years, the focus of important school improvement efforts in the United States and elsewhere.

RESEARCH AND RECOMMENDATIONS

Reading researchers have conducted countless studies to assess the usefulness of phonics and to identify teaching methods that are most efficient. Comprehensive meta-analyses have revealed that systematic, explicit phonics instruction produces the most significant benefits for students in kindergarten through sixth grade and for children having difficulty learning to read. Here are several important findings about phonics, along with recommendations for instruction.

Phonemic Awareness Is Essential

Learners who have the ability to hear and understand that words are composed of discrete, separate sounds are said to be *phonemically aware* and are ready for phonics. Without phonemic awareness skills, students are likely to struggle with their phonics lessons. To identify those in need of remediation, primary teachers should carefully assess their students' phoneme awareness skills. Oral rhyming, syllable tapping, sound segmentation games, sound substitution, and sound blending serve to develop phoneme awareness. A learner who can listen to the word "hug" and segment the word orally into its component sounds, */h/ /u/ /g/,* has mastered phoneme segmentation and is likely to benefit from phonics instruction and be successful in learning how to read.

Good Phonics Instruction Is Explicit

Phonics instruction must be *explicit*—taught directly, actively, and clearly—and practiced until the

content is mastered. Reading programs that focus on implicit or discovery methods of learning are less efficient, especially for children at risk for reading difficulties. Programs aligned with incidental or embedded phonics approaches, the so-called *look-and-say* or whole-word method, basal (controlled vocabulary) approaches, worksheets-only methods (without active teaching), or the Whole Language ideology of reading and literacy instruction typically lack systematic teaching of letter-sound associations. Most students require explicit instruction in sound-symbol correspondences of the alphabet letters and letter combinations; they do best when their teachers use active direct instruction methods.

Effective Phonics Instruction Is Systematic

It does not work well to skip around in the phonics curriculum and teach, for example, the phonogram *ing* one day, prefixes the next day, and the sound for the letter *s* the third day. Beneficial phonics instruction must be systematic, orderly, and sequential. In general, teachers who teach systematically follow a phonics content sequence that progresses from easy to more difficult. Commercial phonics programs usually design instructional sequences similar to the one offered here.

Sequence of Phonics Skills by Grade Level

Pre-Kindergarten

- Phonemic awareness skills (sound segmentation, etc.)
- Alphabet recognition, especially recognition of the lowercase letters (using ABC books, ABC songs, and engaging, fun letter-play activities)
- Sound-symbol correspondence of alphabet letters, short vowels (*a, e, i, o, u*) plus consonants (using puppets, alliterative stories, letter-sound pictures, multisensory, direct instruction, and visual-vocal participation.
- Letter formation practice

Kindergarten

- Phonemic awareness skills (e.g., sound segmentation)
- Short vowels (*a, e, i, o, u*) plus consonants
- Letter formation practice
- Blending practice with easy consonant-vowel-consonant words (e.g., *cat, bed, sit, log, sun*)
- Reading and writing consonant-vowel-consonant words, word family words (e.g., *cat, hat, fat, mat*), and dictated words
- Reading and writing short decodable stories and sentences (e.g., *The dog had a big red hat.*)
- Writing the letters of the alphabet

First Grade

- Phonemic awareness skills (e.g., sound segmentation)
- Short vowels (*a, e, i, o, u*) plus consonants
- Consonant digraphs (*ch, sh, th, wh*)
- Consonant blends (*bl, br, fl, sl, sm, st, tr, pr, str*)
- Silent e (when the e at the end of the word makes the vowel long, as in *same, note, tire, lute*)
- Blending practice with consonant-vowel-consonant words and longer words with initial, medial, and final blends, digraphs, and diphthongs
- Compound words (e.g., *postman, bedroom, cowboy*)
- Vowel digraphs (*ai, ay, ea, ee, oa, ow*)
- Other vowel spelling patterns (*oo, ou, ow, oi, and oy*)
- Word families (e.g., *same, game, tame, name*)
- Endings (*ed, ing*, two sounds for *y* at the end of words)
- Contractions (*I'll, you've, she's, it's, don't*)
- Reading and writing words, decodable stories, and sentences
- Dictation exercises and writing practice to reinforce skill development

Second and Third Grades

- More complex spelling patterns (*ph, ight, ough*)
- More word families
- Soft c (as in *city*) and soft g (as in *gem*)
- Prefixes (*in, un, mis, re, dis*)
- Suffixes (*less, ness, able, ly, ful, est, tion*)
- Silent letters (wr as in *wrap*, mb as in *climb*, gn as in *sign*, kn as in *know*, lk as in *talk*)
- Multisyllabic words
- Root words
- Syllabication strategies (divide between two consonants, *slip/per*, creating a short vowel sound in the first syllable, or divide in front of a single consonant, *pa/per*, creating a long vowel sound in the first syllable, and other strategies)
- Lots of reading practice to make decoding and word identification rapid and automatic
- More writing practice to reinforce skill development

Upper Grades

- Normally phonics skills are not taught in the upper grades. (Most delayed readers, students with learning disabilities, and learners with decoding and word recognition deficits can be taught phonics skills, however, using multisensory, engaging, targeted systematic, explicit phonics instruction and grade-level appropriate decodable texts.)
- Dictation and writing practice are recommended to reinforce skill development.
- High-interest teaching methods and maximum student engagement are recommended to stimulate student motivation.
- Individual tutoring or small-group instruction in phonics may be most effective for learners with reading delays.

Most Children Can Learn to Read

Research reported by the National Reading Panel in 2000 shows that almost all children, even those with learning disabilities and dyslexia, can learn to read, given appropriate phoneme awareness and phonics instruction. In 2004, exciting brain imaging studies using functional magnetic resonance imaging demonstrated that intensive instruction in phoneme awareness and phonics can remap and normalize the neural functioning of dyslexics. Students with normal intelligence who cannot read may simply turn out to be learners who have not received enough focused phoneme awareness and phonics instruction.

Phonics Offers an Array of Benefits

Empirical research demonstrates that systematic, explicit phonics instruction improves the reading of regular education students as well as students with learning disabilities. Phonics improves the word-reading ability of students from both low and high socioeconomic backgrounds. Across all grade levels, systematic phonics instruction improves the ability to spell and, with adequate practice, leads to automatic word recognition and reading fluency. Finally, phonics combined with adequate vocabulary knowledge improves all-important reading comprehension.

But Phonics Isn't Everything

Basically, phonics skills are necessary for learning to read, but they are not the only skills required. Effective reading teachers are mindful of the totality of the reading task and include instruction designed to develop fluency and increase vocabulary and comprehension. Early readers need a great deal of experience reading, especially in connected, leveled, or decodable texts. Reading practice at home and in school (at first aloud and later silently) cements phonics skills and moves the learner toward automatic word recall and reading fluency. Students should also be read *to* both at home and at school, to create a pleasure anchor, to expand background knowledge and vocabulary, and to motivate them to read independently. Written, oral, and computer literacy activities and comprehension skill development are also important ingredients in a total reading curriculum. Phonics alone should not constitute a beginning reading program.

Don't "Drill and Kill"

An essential bridge to word identification, phonics can nonetheless be poorly taught or excessively taught. In some regrettable situations, phonics is not actually taught at all, but daily worksheets are passed out that students are expected to complete independently. Old-fashioned dreary drills and motivation-quashing busywork assignments are clearly not components of effective reading instruction. Active, social, engaging phonics lessons followed with reading in connected text, however, provide vital scaffolding as learners acquire reading strategies.

The Purpose of Phonics Is to Enable Learners to Read Well

The goal is reading. Educators and parents must remember that the purpose of phonics instruction is not to memorize phonics rules or generalizations, but to provide learners with skills they need to read and write easily and well. Effective phonics leads to fluency and reading comprehension, and can engender a lifelong love of reading. It is the means to an end.

—Lynn Melby Gordon

See also Whole Language

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PHONOLOGICAL AWARENESS

Phonological awareness is the sensitivity and ability to manipulate the sound structure of language and the understanding that spoken language is made up of individual and separate sounds. Phonological awareness is now recognized as playing a causal role in learning to read alphabetic script systems and as being the core deficit for most children having difficulty learning to read. Children who enter first grade low in knowledge about the phonological features of words are at a high risk for difficulties in benefiting from early reading instruction. Children delayed in the development of phonological awareness have a very difficult time making sense of phonics instruction because they have trouble noticing the phonemic patterns in written words.

One common misunderstanding is that phonological awareness and phonics are the same thing. Phonological awareness, including phonemic awareness, is not phonics. Phonics is the knowledge that there are predictable relationships between phonemes and the letters that represent those sounds in written language. Phonological awareness is the understanding that the sounds of spoken language are the underlying elements of words. Therefore, phonological awareness is needed to benefit from phonics instruction.

Phonological awareness appears to develop gradually during the preschool and early school years. It is best viewed as a hierarchy of sensitivity or levels of complexity. Higher levels of sensitivity require more explicit awareness and manipulation of smaller-sized language units (e.g., phonemes), whereas more elementary sensitivity requires the manipulation of larger sound units (e.g., syllables). For example, "Say airplane without saying */air/*," would be a word-level task. A phoneme-level item would require manipulation or awareness of individual phonemes. For example, "Say hat without saying the */h/* sound."

Children typically achieve syllabic and rhyme sensitivity and sensitivity to onset-rime before they achieve sensitivity to phonemes. The awareness of and ability to manipulate phonemes is often called phonemic awareness or sensitivity. Phonemic awareness appears to be especially important in the development of word decoding skills. Even though phonological awareness is considered to develop in levels, it is now considered to consist of one underlying or unitary construct that is very stable from at least the late preschool period through formal reading instruction.

Tasks used to assess phonological awareness tend to vary substantially, and children can demonstrate phonological awareness in several ways. Broader and more elementary phonological awareness skills can be demonstrated by identifying and making oral rhymes. For example, "Mat wore a (hat)." Other tasks require counting syllables, identifying and isolating onsets or rimes, or identifying and working with the individual phonemes in spoken words. Tasks can also be constructed to require the categorization of words, the blending of word parts, or the segmentation of words. For example, a phoneme blending task would require a child to listen to a sequence of separately spoken phonemes and then combine the phonemes to form a word.

Before children can learn to decode words, they need to become aware of how sounds in words work, that is, that words consist of speech sounds. Effective classroom phonological awareness instruction teaches children to notice, think about, and manipulate sounds in spoken language. Activities that build phonological awareness, especially phonemic awareness, include isolating and identifying the individual sounds in spoken words, blending sounds to make words, and breaking spoken words into their separate sounds. Phonemic awareness instruction is most effective when children are taught to manipulate phonemes by using the letters of the alphabet. Vocabulary development also appears to play a key role in the development of phonological awareness. Other general

activities that promote phonological awareness growth are shared reading, letter name and sound play, and rhyming games.

—Stephen Burgess and Tabitha Smith

See also Language Development

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PHYSICAL DEVELOPMENT AND GROWTH

Differences in physical growth are apparent from everyday observations of people around us. We differ in terms of height, weight, the relative length of our body proportions, and fitness. We also differ in our abilities to move and perform physical skills and tasks. These differences provide valuable insights into our maturation, overall development, and health. As such, the study of physical growth and development is central to child development, medicine, education, and a host of other disciplines. It is also a subject of personal interest to all people in possession of a body.

STAGES OF PHYSICAL GROWTH

The general pattern of physical growth is similar for all individuals. There can be considerable variations, however, in terms of the rate and timing of growth and the size attained. Chronological age provides an obvious point of reference for observing and recording growth. Its significance should not be overstated, though; biological events and processes follow their own schedule. As it is sometimes said, biology does not celebrate birthdays!

Table 1 Stages of Human Growth

Stage	*Age / Growth Event*
Prenatal Growth	
Ovum Period	First 2 weeks after fertilization Cell division and increasing complexity
Embryo Period	Weeks 2 through 8 Steady growth; differentiation of cells into tissues, organ and systems
Fetus Period	Weeks 9 through 40 Rapid growth in size and mass; changes in body proportions; development of function in tissues, organs and systems
Postnatal Growth	
Infancy	Birth to end of weaning (about 24–36 months)
Early Childhood	Weaning to about seven years of age
Later Childhood	Seven years of age to puberty
Adolescence	Puberty to sexual and physical maturation, at about 20 years of age
Adulthood	20 years of age to end of menopause (for women)
Senescence	Menopause to death

Table 1 offers a brief overview of the different stages of human physical growth and the ages and events that often relate to them. Of course, any model of stages of development is necessarily somewhat arbitrary. The one presented here provides one way of understanding the process of physical growth, from conception to death.

The clearest distinction in human growth is between prenatal and postnatal stages. For obvious reasons, studies of prenatal growth are far more difficult to carry out than postnatal studies. However, recent research has offered valuable information and a more complete picture of physical growth throughout the course of life.

Prenatal Growth

There are two common approaches for categorizing growth in the prenatal period, which comprises on

average 9 months, or 40 weeks. One way is in terms of the development of the organism as an ovum, an embryo and a fetus. The other approach is the well-known trimester model in which the course of pregnancy is usefully divided into 3-month periods. Discussing prenatal development in terms of trimesters is useful in certain contexts, such as clinical settings with mothers. However, because it only crudely relates to actual biological events, its value is limited. For this reason, the following discussion will consider prenatal growth in terms of biological events, particularly the development of the ovum, the embryo, and the fetus.

The Ovum

Growth begins at the moment of conception with the fertilization of the ovum (the mother's egg) by the father's sperm. The period of the ovum comprises the first 2 weeks after fertilization. It is a process of self-duplication and multiplication from single cells into tens of thousands of new cells. As cell division takes place, the cluster of cells resembles a raspberry and then changes position to form a hollow disk. During the second week after fertilization, the disk implants itself in the wall of the uterus (or womb), and a number of cellular layers become differentiated, including one that develops into the embryo.

The Embryo

Beginning with the formation of the embryo during the second week, this period is characterized by quite rapid growth differentiation of cells. Cells become specialized and organized to form the different tissues, organs, and bodily systems. By the end of this period, at about week 8, the embryo has developed the basic physical and functional features of a human, and changes during subsequent weeks are mainly in the dimension of physical features and refinement of functions. No new anatomical features appear after the embryo period.

The multiplication of cells and the specialization or differentiation of these cells into different organs and tissues makes the early stages of life highly susceptible to growth pathologies due to either genetic abnormalities or harmful environmental conditions, such as mother's poor nutrition or disease.

The Fetus

By week 9, the process of differentiation and specialization into tissues, organs, and bodily systems is largely complete. Growth is rapid during this period, especially from week 20. In fact, 90% of body weight at birth is attained during this second half of pregnancy. As well as marked increases in size and weight, the fetus period is characterized by changes to the body proportions. The embryo has an extremely large head in relation to the rest of the body, but as the fetus develops, the back and limbs grow rapidly in relation to the head, and the fetus takes a form much more recognizably human.

Importantly, from the perspective of the individual's survival after birth, the development of several bodily systems like blood circulation, breathing, and digestion occurs, preparing the fetus for the transition to life outside of the mother's uterus.

Postnatal Growth—The Growth Curve

The introduction of what has become known as the growth curve dates back to 18th-century France. Count Philibert Gueneau de Montbeillard measured the height of his son every 6 months from birth to 18 years of age, and these measurements were reported by his friend and celebrated scientist, George-Louie Leclerc de Buffon. These measurements were significant because they represented a new and valuable approach to measuring physical growth. Before this advance, the most common method for assessing growth was cross-sectional study, in which an individual is measured once. There is an inherent limitation of this approach because it can tell us nothing about individual development from 1 year to the next. It is precisely information about variability and changes in rates of growth that is most useful to both clinicians, wishing to compare an individual's rate to standards, and researchers, studying the relationship between early influences and later physical growth. A difficulty with the original measurements of Montbeillard's son was that they were recorded using antiquated French units. It was not until an American, Richard Scammon, converted these measurements into modern metric units in the early part of the 20th century that the information was made widely available in the form of a chart.

Growth charts are now staple elements of the study of physical growth. Despite the technological advances made in recent years, Montbeillard's measurements were remarkably accurate and reveal distinct phases of growth that continue to be valid today.

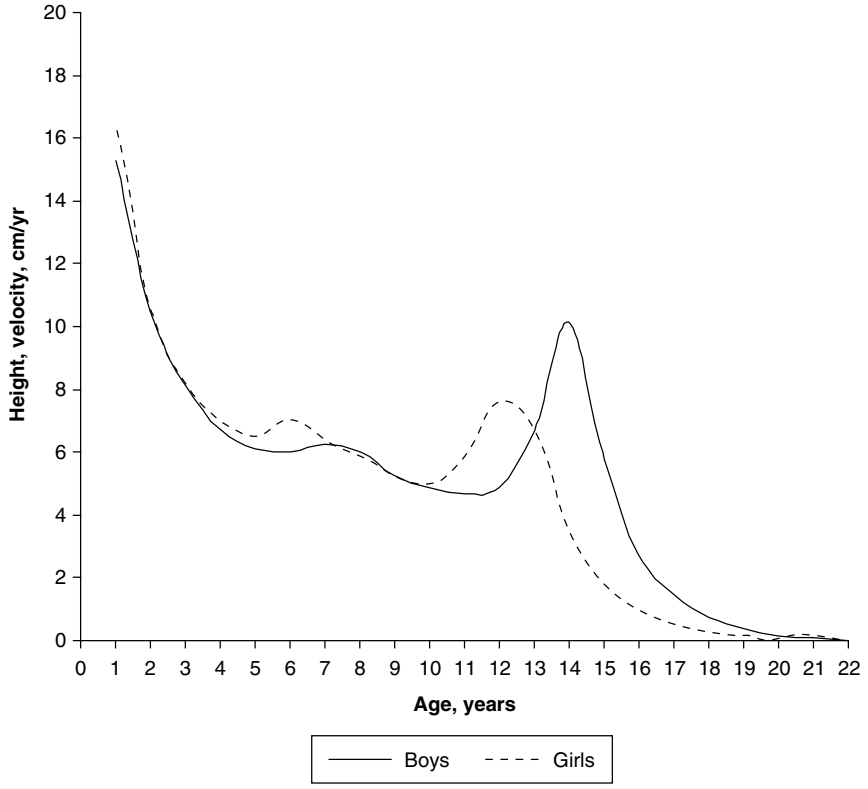

Figure 1 Idealized Mean Velocity Growth Curves for Boys and Girls

Scammon's chart described the height achieved by the boy at all ages between birth and 18. This is called a *distance curve* because it reflects the child's progression toward maturity. Distance curves reveal some important facts about physical growth. There is obviously dramatic growth throughout the first 18 years of life, with a difference in height gains between boys and girls occurring around the early teen years. However, this is nonlinear: the individual does not increase the same amount of height each year, and there are periods of relatively large growth and others of relatively little growth. Although the distance curve can give a hint of these different stages of growth, these stages are far from clear. What is needed to show the differences in rates of growth over time is a *velocity curve*. An idealized velocity curve is shown in Figure 1.

Immediately, it is possible to see that physical growth takes place through quite distinct phases. It is also possible to identify two spurts, the first occurring at about 6 to 8 years of age and the second, longer one, beginning at about 10 years for girls and 12 years for boys. Using the evident changes in the rate of growth as a starting point, it is possible to divide postnatal growth into a series of phases, with each phase characterized by distinct growth events and processes.

Phases of Postnatal Growth and Development

Although all human experience has the same basic pattern of growth, there are significant differences in individual rates and timing of growth during the life span. This is not just a point of academic interest. A school teacher of a class of 12-year-old girls or 14-year-old boys may be confronted with students of vastly different degrees of physical maturity, including relatively immature children and mature individuals who are almost adults.

Infancy

Infancy begins with birth and ends when the infant changes from lactation to eating solid food. The age of this development varies between different societies, and this variation is exacerbated by the trend in industrialized countries to reduce or eliminate the period of breast-feeding. In more traditional societies, which would seem to offer a more reliable indication, weaning normally ends at about 2 or 3 years.

The first months of postnatal life, called the *neonatal period*, is a time of transition from the womb to the outside environment. The infancy phase is a period of rapid growth in most physical dimensions and bodily systems. Although there is a clear increase in the distance of growth, this period is characterized by a steep decrease in velocity. In many respects, this growth is a continuation of the fetus growth pattern. Alongside increases in height and weight during the first years, changes also occur in body proportions. Particularly

Table 2 Ages at Which Movement Skills Are Achieved

Age Range (months)	*Motor Milestone*
0.7–4.0	Head held erect
0.7–5.0	Turns from side to back
1.0–5.0	Sits upright with support
4.0–8.0	Unilateral reaching
5.0–9.0	Sits alone unsupported
5.0–12.0	Pulls up to stand position
7.0–12.0	Walks with assistance
9.0–16.0	Stands alone
9.0–17.0	Walks alone

noticeable is the relatively large head during infancy, which represents 25% of the total body length and is almost 70% of its eventual adult size. In the first year, the head accounts for 20% of body length, and by adulthood, it accounts for just 12%, with the legs taking 50% of total stature.

Infancy is associated with the development of the musculoskeletal frame and the nervous system, especially the brain, which grows more rapidly during infancy than any other tissue or organ of the body. This development facilitates a host of cognitive and movement achievements. Most early movement is characterized by reflex actions, which are broadly defined as involuntary actions triggered by a range of external stimuli.

The period from 12 to 24 months is a time for the infant to practice and master many of the actions initiated during the first year and to add new ones. Although the rate of acquisition of skills varies according to each individual, the sequence of skills is quite predictable and seems to transcend social, cultural, and ethnic boundaries. Findings from research during the 1930s and 1940s established the creation of "motor milestones." These are basic to skilled performance as each skill is a landmark in an infant's movement development (see Table 2).

Early Childhood

Following the deceleration of growth during infancy, the years between 3 and 7 witness a period of relatively rapid physical growth. It has often been noted that a characteristic feature of early childhood growth is its predictability, and a common pattern seems to be shared by all healthy children. In fact, this predictability has been used to good effect in clinical and epidemiological settings, to help detect ill health, by assessing deviations from normal growth.

Although children of this age have been weaned, they remain dependent on adult support, mainly because of their still developing cognitive and movement capabilities. Early childhood is a time for developing mastery in basic movement skills and for testing oneself physically in different environments. Movement activities can be viewed from various perspectives, but most are based on the categories of stability (or balance), locomotion (or traveling), and manipulation (or control) because these are found in all ages. One further classification is into fine motor and gross motor activities. Fine motor activities involve movements that require precision and dexterity, usually regulating the use of hands and eyes together. Movement patterns in this category include writing, drawing, cutting, pasting, and the manipulation of small objects and instruments. Gross motor activities involve the whole body or major segments. Often referred to as *fundamental motor skills*, they include such skills as running, jumping, twisting, turning, hopping, throwing, and kicking (see Table 3).

Later Childhood

The transition from early to later childhood is sometimes marked by an increase in growth velocity, called the midgrowth spurt. During the subsequent phase, which occurs between about 7 years of age and the onset of puberty, the rate of growth declines. The rate of growth during later childhood, in terms of height and weight, as well as body tissues and systems, is the slowest since birth. Differences in size between boys and girls are insignificant during both early and later childhood phases. However, an extremely important difference does appear at the end of later childhood, as girls enter puberty some time before boys. Girls' later childhood period ends at about 10 years of age; for boys, it is at about 12 years.

The period between 7 years and puberty is sometimes referred to as the *skill-hungry years*. Occurring between the periods of rapid growth in early childhood

Table 3 Movement Skills in Early Childhood

Age	*Fine Skills*	*Gross Skills*
3 years	Picks up blocks	Stands on one foot
	Places shapes in holes	Walks backwards and sideways
	Turns the pages of a book	Jumps down from a step
	Paints at an easel	Kicks a large ball with force
4 years	Holds a pencil in an adult way	Pedals a tricycle
	Copies a square accurately	Hops on the spot and along
	Brings thumbs into opposition	Bounces a large ball
	Colors inside lines	Runs smoothly
5 years	Uses a knife and fork competently	Can touch toes when upright
	Threads a needle and sews	Jumps for height up to 30 cm
	Copies a triangle accurately	Dances rhythmically to music
	Does jigsaws with joining pieces	Walks downstairs with alternating feet
6 years	Ties own shoe laces	Skips with alternate feet
	Writes first and last names	Catches a ball with consistency
	Holds a pencil with finger tips	Kicks a football up to 6 meters
	Builds a straight tower of cubes	Throws a ball using wrists and fingers

and adolescence, it represents a time of relative stability, during which children can extend their physical competence in different contexts. Having already established fundamental movement skills, children now develop their skills in new and challenging situations. They do this by refining, combining, and elaborating on their fundamental movement skills to perform more specialized, often more socially stereotypical actions, such as sports, dance, and games.

Adolescence

Progression to adolescence is marked by a rapid acceleration in the velocity of growth of almost all body parts, although different parts of the body reach their peak rate of growth at different times. The duration of the period of acceleration, called the *adolescent growth spurt*, is usually greater in boys than in girls, although there is a great deal of individual difference. On completion of the adolescent growth spurt, men are, on average, taller and heavier than women. This seems to be common to all societies and ethnicities. The difference in final height and weight between males and females appears to be attributable to two main factors: the delay of the onset of puberty in boys and the greater intensity of the growth spurt in boys. The consequences of these, and other factors, is the adult stature of women averages about 90% of the stature of men.

Adolescence is the time when sexual maturation takes places, with visible signs such as a sudden increase in the density of pubic hair, and, in the case of girls, the development of the breast bud. Other significant events during adolescence include the production of viable sperm in boys and egg cells in girls, although these do not signal full sexual maturity. This is particularly the case in girls, for whom the first menstrual period, or menarche, is often followed by a period of sterility. On average, girls are not fertile until about 14 years of age or later, and a further 4 years are often needed before full sexual maturity is reached. The adolescent stage of growth is also the phase during which secondary sexual characteristics develop, such as changes to the external genitalia and differences in body size and body composition.

Adulthood and Senescence

The transition from adolescence to adulthood is primarily characterized by two events: the end of increases in height and full reproductive maturity. The course of physical growth during adulthood is relatively uneventful. Regular, weight-bearing physical activity will increase muscle mass; regular, low-intensity exercise will generally decrease body fat, whereas overeating will increase the amount of body fat. Generally speaking, however, the adult stage is characterized by its stability.

Western men and women from high socioeconomic groups tend to reach adult height at about 20 years and 18 years, respectively. Other groups tend to achieve adult height a little later, with the cultural differences presumably attributable to degrees of access to quality nutrition and health care. Those suffering from undernutrition may continue to grow for some years later, although they rarely reach the final stature of their healthier, often wealthier peers.

Aging, or senescence, is characterized by a process of decline in an individual's ability to reproduce and adapt to stress. There is a large degree of variability in the onset and nature of senescence. Although some traits, such as loss of skin elasticity, reduced movement capacity, and female menopause, or the end of menstruation at about 45 and 55 years, are common to most societies; others, such as cardiovascular disease, brittle bones, and arthritis, are more likely to be culture-specific consequences of Western lifestyles.

MEASURING GROWTH

The evolution of the study of physical growth has been briefly discussed in the previous section. Essentially, there are two basic kinds of studies: cross-sectional and longitudinal. In cross-sectional studies, individuals are measured once. Typically a large number of individuals are measured at each chronological age, and the average measurements are calculated. Longitudinal studies involve repeated measurements of individuals over a number of years. Compared with cross-sectional studies, longitudinal research is very time consuming and usually necessitates a restricted sample size. This partially accounts for the relative variety of longitudinal studies of growth.

Recent advances have made available a great number of tools for measuring physical growth. Some of these tools involve the use of complex specialist equipment; however, most growth studies continue to use methods that are quite easy to understand and replicate.

The potential measures that could be made of the human body are almost infinite, but certain techniques have been established, and some of these are listed and described in Table 4.

REGULATION OF PHYSICAL GROWTH

The process of physical growth is a complex one, influenced by genetic, hormonal, and environmental factors. Genes offer a potential range for achieving physical size and shape, and the environment partly determines the eventual growth within that range.

Genes do not influence growth directly. They produce proteins that regulate a genetically inherited pattern of growth, mediated by the endocrine and neurological systems. In essence, the endocrine system—the system of glands under neural control responsible for the release of regulatory chemicals—provides the biochemical environment in which genes act. For example, the adolescent growth spurt cannot occur without the release of sufficient quantities of growth and sex-specific hormones into the blood. Harmful environmental insults cause a reduction in the release of growth hormone and other hormones, resulting in reduced growth. To this extent, the endocrine system acts as an intermediary between the action of the genes and the influence of the environment.

Although genes and the endocrine system have significant influence on the regulation of physical growth, environmental factors—those that are nongenetic and external to the organism—can also account for some of the differences between individuals. Unfavorable environmental conditions, such as nutrition, negative psychological and social experiences, and pollutants, can start to affect growth adversely from shortly after the moment of conception, and continue throughout the life span.

The effects of harmful environmental conditions on growth seem to be dependent on the severity and duration of the problem, as well as the age at which it occurs. Young children are particularly vulnerable to such insults. However, there is some evidence to suggest that, when the insult is removed and adequate nutrition is available, retardation of growth is usually followed by a period of catch-up growth, during which the individual rapidly returns to or approaches a normal rate of growth. A useful analogy for this period of catch-up was provided by the British geneticist, C. H. Waddington, who compared physical growth to the movement of a ball down a valley floor. He suggested that an insult may knock the ball away from a central pathway, and the velocity of its movement will then reduce. Once the insult is corrected, though, the ball returns toward the valley floor at an increased speed, upon which normal velocity recommences. If the insult is not corrected, perhaps because of continued poor diet, the individual may resume growth at a relatively slower rate, and skeletal maturation may be delayed, extending the period of growth. Scholars disagree regarding the long-term effects of harmful environmental conditions during infancy and childhood, but there is some evidence

Table 4 Common Measurements of Individual Growth

Stature	Standing	Floor to top of head (no shoes)
	Lying	Feet to top of head while lying on back
	Sitting	Sitting surface/buttocks to top of head
Breadth	Shoulders	Outside of left to outside of right upper arm
	Hips	Outside of left to outside of right hip, at waist
	Knees	Widest aspect
	Elbows	Widest aspect
Circumferences	Upper arm	Midway between shoulder and elbow, with arm hanging loosely to side
	Calf	"Belly" calf, standing
	Head	Forehead level
Skinfold	Triceps muscle	Double-fold of skin at back of upper arm
	Subscapular	Fold beneath shoulder blade
	Suprailiac	Fold above waist

to suggest that severe difficulties can result in negative lasting effects. In most cases, however, it seems to be the case that growth merely slows down in response to harmful conditions, and waits for better times.

Because environmental factors rarely operate in isolation, it can be difficult to quantify the precise relationship between specific influences and physical growth. Nevertheless, there are certain factors that have well-documented effects on physical growth, including nutrition, social and environmental status, psychological stress, and pollutants.

Nutrition

Adequate nutrition is of fundamental importance to physical growth and development. A reduction in the rate of growth is one of the first responses to restricted food intake, and in countries where food is persistently limited, growth delays occur, and children tend to be shorter and lighter than in countries with adequate food supplies. In fact, so strongly associated are growth and nutrition that measurement of physical growth is one of the most widely used indices of nutritional status in children.

Although the effects of poor nutrition can be experienced at all stages of development, including during the prenatal growth, infancy and early childhood represent the periods during which the developing child's system is unusually sensitive to malnutrition. This seems to be, in part, because the first years of life witness the most rapid growth. International studies suggest that about half of all deaths during the first 5 years result from the effects of poor nutrition and the associated inability to fight infectious diseases.

Adolescence is another period when individuals are especially vulnerable to the harmful effects of malnutrition. Nutritional needs are greater during this period than at any other time of life, and although the rate of proportionate growth is somewhat less than during the early years, it persists for much longer. As is well known, adolescence is a time when young people experiment with food choices, and inappropriate choices can have profound and long-lasting effects. Conditions such as anorexia nervosa (a disorder characterized by an abnormal fear of becoming obese) and bulimia nervosa (an eating disorder, in which binge eating is often followed by feelings of guilt and fasting) are especially common among adolescent girls and can seriously threaten both health and physical growth. Aside from retarding an individual's rate of growth, inappropriate diet can also have harmful effects on skeletal development, and insufficient food intake has been associated with the development of osteoporosis, or brittle bones, in women.

Social and Economic Status

Children from poorer families are generally shorter and lighter than their peers in higher-income families. They also consume less food. The timing of growth, rather than growth itself, seems to be most affected by social and economic factors; for example, the onset of puberty occurs earlier in individuals from wealthier groups than those from poorer groups. Studies of preschoolers have reported differences in height,

weight, skin-fold thickness, and musculature in favor of children from high social and economic status families. By the time they reach adulthood, much of the difference is reduced or even cancelled. Social and economic factors are most evident among males. In fact, most environmental influences seem to affect males more strongly than females. The reasons for such differences are unclear.

Psychological Stress

There is considerable evidence that extreme stress can slow physical growth and development. The mechanisms involved in such effects are unclear, although stress may negatively affect the secretion of growth hormones. A cluster of factors like maternal care, social isolation, parental substance abuse, and sexual abuse are linked to psychological and emotional ill health. Recent research has also indicated that some children are genetically predisposed to stress and respond to it in an extreme and prolonged manner that results in restricted growth.

Pollutants

Physical growth is sensitive to several pollutants, including lead, air pollution, certain organic compounds, and tobacco smoke. Of course, pollutants are somewhat unavoidable in the modern world, but levels of pollution vary considerably, and so its effects will be different among different groups. To take only one example, smoking by the mother during pregnancy is well known to affect both birth weight and an infant's subsequent growth. It also seems that living in a home with smoking parents is related to reduced height and weight throughout infancy and childhood. The insult to weight seems to be corrected as the individual moves toward adolescence; the deficit in height is probably never made up.

CONCLUSION

Physical growth is essentially a biological process, but it is affected and constrained by the environments in which it takes place. The interaction of biological and environmental factors accounts for the great variation in growth that is evident among both individuals and whole populations. It also influences the development of other physical characteristics, such as movement skills.

Growth is an important, if often overlooked, aspect of human development. Its centrality is most evident during the periods of infancy and childhood, when physical changes make available a wide range of new behaviors and experiences. Physical growth and development affect the way individuals perceive themselves and how others perceive them. Growth also gives visible clues of an individual's stage of overall development and of that individual's state of health and well-being. As such, it warrants attention by all of those interested in human development.

—Richard Bailey

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PIAGET, JEAN (1896–1980)

The Swiss psychologist and renowned scientist in cognitive psychology, Jean Piaget is arguably best known for formulating his influential theory of childhood cognitive development. Piaget was the oldest child of Rebecca Jackson and Arthur Piaget, an academic in the field of medieval literature. Piaget studied the natural sciences at the University of Neuchatel and by the age of 21 had published 25 articles on mollusks. In 1918, he was granted a doctorate degree in biology and began pursuing his interest in incorporating empirical methods into the field of genetic

epistemology—the study of the development of knowledge.

Following graduation, Piaget studied psychoanalysis and experimental methodology at the University of Zurich and then at the Sorbonne in Paris. It was in Paris that Piaget collaborated with Alfred Binet and Theodore Simon to construct intelligence tests for children. As such, Piaget observed many of the errors that children made on intelligence tests and began to notice possible sequential steps involved in children's cognitive development.

Piaget viewed cognitive development as a result of the interaction between the individual and the environment. His perspective contrasted with two other dominant views of cognitive development, one positing that cognitive development derived from innate abilities, and the other positing that children's minds were blank slates that passively acquired knowledge from the environment.

Piaget proposed that children progress through four stages of cognitive development that follow an invariant order: (1) the sensorimotor stage (newborn to 2 years), in which infants understand their world through direct actions; (2) the preoperational stage (2–6 years), in which children begin to represent people, objects, and events in an illogical and egocentric manner in their minds; (3) the concrete-operational stage (6–12 years), in which children logically reason about concrete events in the world; and (4) the formal-operational stage (beyond age 12), in which children are capable of abstract and hypothetical thinking. Piaget emphasized that children's minds are not necessarily immature versions of adults' minds; rather, children's cognitive processes qualitatively differ from those of adults.

Overall, Piaget's formulations of cognitive development have yielded major insights into the child's mind. Despite the fact that his theory has been fairly criticized by contemporary researchers, Piaget's ideas have had a lasting effect on the field.

—Andrew E. Molnar and Matthew J. Hertenstein

See also Cognitive Development, Concrete Operational Period, Fluid Intelligence, Theories of Development

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POLYCHLORINATED BIPHENYLS (PCB)

Polychlorinated biphenyls (PCBs) are a class of organochlorine chemicals that were discovered to be teratogenic in two mass human poisoning incidents due to contaminated cooking oil in Japan in 1968 and in Taiwan in 1978. The acute illness was termed *Yusho* in Japan and *Yu-Cheng* in Taiwan, for "oil disease." The onset of acute symptoms of PCB exposure in adults is delayed after exposure by a month or more. The symptoms of acute PCB exposure include chloracne (a rash with blackheads and acne-like eruptions), fatigue, nausea and vomiting, swollen eyelids, disturbed vision, numbness and pain in the limbs, and altered liver function. Prenatal exposure to PCBs and related chemicals (dibenzofurans and dioxins) in the contaminated cooking oil in Japan and Taiwan caused birth defects including mental retardation, misshapen fingernails, discolored skin, abnormal eye secretions, natal teeth, and dental malformations.

After the discovery of the teratogenic effects of PCBs in these poisoning incidents, prospective longitudinal studies were begun of low-level exposure to PCB residues in food. One longitudinal study found that prenatal exposure to much lower concentrations of PCBs from residues in food (Lake Michigan sport fish) is associated with suboptimal neurological functioning in infancy, lower performance on an infant memory test (the Fagan Test of Infant Intelligence), lower performance on attention and memory tasks in childhood, and lowered intelligence quotient (IQ) and reading test scores in late elementary school. More highly exposed children were slightly smaller, indicating that physical growth is also altered. Research controversies have centered on the replicability of the results, whether PCBs themselves are responsible for the effects as opposed to other contaminants that occur in the presence of PCBs, and what PCB congeners (chemical variants) may actually be responsible for the observed effects.

Other prospective longitudinal studies of PCB and organochlorine chemical exposure in Europe and the United States have largely replicated the results of the study of Lake Michigan fish eaters. In addition, findings indicate that children prenatally exposed to higher

levels of PCBs show altered gender-related play, lower immune system functioning, and altered latencies of auditory evoked potentials. Older adults chronically exposed to PCBs in Lake Michigan sport fish show impaired memory performance.

PCBs are lipophilic (have an affinity for fat) and biomagnify up the food chain. PCBs were phased out of use in the United States and most industrialized nations in the late 1970s but remain inside closed systems such as power transformers. However, because of their former widespread use in many industrial and consumer products, PCBs are found in small concentrations in the fat of virtually all animals and are excreted by mammals in breast milk. Global transport by air and biomagnification in the food chain have resulted in high concentrations of PCBs in arctic mammals such as polar bears and walruses. Arctic peoples eating traditional diets of arctic mammals also have high PCB concentrations.

PCBs are endocrine disruptors that can alter thyroid function. Low thyroid hormone was one of the first causes of mental retardation to be discovered. Any substance that alters thyroid functioning in the mother or fetus has potential to affect brain development. PCB body burdens in industrialized countries have dropped since phase out of the chemicals began in the late 1970s. However, the concentrations of chemically related pollutants such as polybrominated diethyl ethers (PBDEs), a substance widely used in flame retardants, are rising rapidly in people and animals. PBDEs are still in use in the United States. PBDEs are also endocrine disruptors and are known to affect thyroid functioning.

—Colleen F. Moore

See also Teratogen

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POSITRON EMISSION TOPOGRAPHY (PET)

Positron emission tomography (PET) is a relatively new visual neural-imaging methodology that identifies variations in cerebral blood flow in regions of the brain. This fact makes PET a useful tool for scientists who are interested in identifying specific regions of the brain that are used during the execution of a task.

The logic underlying PET is quite sophisticated. First the patient is injected with a nontoxic, slightly radioactive isotope while engaged in a task. The most common isotope used in cognitive studies is oxygen-15 (^{15}O), an unstable form of oxygen that is usually injected into the bloodstream. As the patient continues to engage in the task, neural activity increases in the regions of their brain that are used to execute the task. These increases in neural activity result in increases in metabolic requirements and, consequently, additional blood flows to these active regions carrying the fuel for neural activity (i.e., glucose) as well as the radioactive isotopes (i.e., oxygen-15). Because the radioactive isotopes are unstable, they rapidly decay by emitting positrons. When these emitted positrons collide with electrons, they annihilate each other, resulting in the formation of gamma rays. More gamma rays are present in brain regions with greater metabolic activity (i.e., blood flow) than in brain regions with less metabolic activity because these regions consume more glucose. The PET scanner, which is essentially a gamma ray detector, locates the origins of gamma rays, and these origins are mapped into an image of the brain by a computer. The computer, which is sensitive to variations in intensities in gamma radiation, color codes the image by using a more intense color for those regions of the brain with more gamma rays (i.e., greater metabolic activity) and a less intense color for those regions of the brain with less gamma rays (i.e., less metabolic activity). In other words, the regions of the brain that are used more heavily during the execution of the task are depicted in the image with an intense color, whereas the regions of the brain that are less active during the execution of the task are depicted with a less intense color.

The main reason scientists use PET is to identify the specific regions of the brain that are used to execute a specific task. However, because the brain executes a number of other activities while the task of experimental interest is being executed, a patient

completes two conditions: a control condition and an experimental condition. During the control condition, the patient's cerebral blood flow is scanned as the patient rests or views a blank stimulus screen. This scan is commonly called the *baseline scan*. During the experimental condition, the patient's cerebral blood flow is scanned as the patient executes the task of experimental interest. This scan is called the *load scan*. By subtracting the image of the baseline scan from the image of the load scan, a difference image is created. This difference image reveals those regions of the brain that are unique to the execution of the experimental task of interest.

One of the strengths of PET is its good visual resolution; however, the temporal resolution of PET is quite limited. It takes minutes to record an image using PET, whereas the execution of a task typically occurs within seconds. Consequently, scientists tend to use PET in concert with other neural-imaging methodologies that are known to have much better temporal resolution. Two of these methodologies are event-related potentials and functional magnetic resonance imaging.

—Brenda A. M. Hannon

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POSTPARTUM DEPRESSION

Postpartum depression is depression in mothers that occurs following the birth of their child. Women often feel pressure from others to experience joy and delight after giving birth; however, in reality, normal postpartum adjustment often involves a difficult transition to a new role, decreased freedom, and increased financial constraints. Contrary to media depictions of women with severe postpartum depression who harm their children, most women with postpartum depression experience symptoms of mild to moderate severity that readily respond to treatment. It is well established that depression generally results from a combination of vulnerability factors (e.g., genetics, pessimistic cognitive style) and stressful life events; examination of depression in the postpartum period provides an opportunity to consider the manner in which vulnerability factors put women at risk for experiencing depression in the context of a discrete, clearly defined stressor.

DIAGNOSIS

Although postpartum depression is readily identified in the research literature and in the media, there is no official diagnosis of postpartum depression per se. Instead, the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* indicates that women are assigned a diagnosis of major depressive disorder with postpartum onset if they meet criteria for a major depressive episode within the first 4 weeks following childbirth. A diagnosis of major depressive disorder requires that individuals endorse at least five of the following symptoms: depressed mood, lack of interest or enjoyment in activities, appetite disturbance, sleep disturbance, fatigue, worthlessness or inappropriate guilt, concentration difficulties or indecisiveness, and suicidal ideation. These symptoms must occur more days than not over at least a 2-week period and cause life interference or significant personal distress. Although this is the definition that mental health practitioners use for diagnosing postpartum depression in their clinical practice, some researchers have defined postpartum depression as being either a major or minor depressive episode (i.e., consisting of fewer than five of these symptoms) following childbirth. It also is important for clinicians who diagnose postpartum depression to realize that many features of normal adjustment (e.g., sleep deprivation) overlap with symptoms of depression. Thus, such symptoms should be regarded as indicative of postpartum depression only if they are in excess of what is considered normal adjustment for postpartum women. A useful tool to screen for depression specific to the postpartum period is the Edinburgh Postnatal Depression Rating Scale.

Some researchers have documented that postpartum depression lasts, on average, between 6 and 8 weeks; however, there are many instances in which postpartum depression extends beyond the first year following childbirth. Although the *DSM-IV* postpartum onset specifier indicates that the major depressive episode begins within 4 weeks after childbirth, many women with postpartum depression also report major

depression during pregnancy, and there are many instances in which women develop depression several months after childbirth. Recently, researchers have raised the possibility that there might be two types of postpartum depression—discrete episodes that begin following childbirth, and recurrences of non-postpartum depression.

Research conducted in the 1990s indicates that postpartum depression is similar to depression that occurs at other times in women's lives, such that both types of depression are characterized by similar symptom profiles and psychosocial correlates. However, older research suggests that postpartum depression is qualitatively different from non-postpartum depression, in that it is associated with high levels of anxiety, hostility, agitation, and guilt; an external (versus internal) locus of control; and perceived uncontrollability. Older research also has found that women with postpartum depression are less likely to endorse suicidal ideation than women who report depression at other times in their lives.

Postpartum depression is often contrasted with two other instances of postpartum emotional disturbance. The *postpartum blues* is a mild and transient mood disturbance that begins during the first week postpartum and lasts between a few hours and a few days. Between 50% and 80% of postpartum women experience the blues, and it is associated with few negative consequences, although more women who subsequently endorse postpartum depression indicate that they experienced the blues than did women without postpartum depression. Typical blues symptoms include crying, mood lability, irritability, anxiety, and insomnia. In contrast, *postpartum psychosis* characterizes women who exhibit psychotic symptoms following childbirth, such as confused thinking, delusions, hallucinations, and disorganized behavior. The prevalence of postpartum psychosis is between 1 in 500 and 1 in 1,000. The length of postpartum psychosis is variable, and it requires immediate attention and often inpatient hospitalization.

EPIDEMIOLOGY

Meta-analytic studies have estimated the prevalence of major and minor postpartum depression to be about 13%. The time period associated with the definition of postpartum depression has a great impact on observed prevalence rates because the prevalence increases to about 22% when postpartum depression is defined broadly as depression occurring in the first 6 months after childbirth. Moreover, research has shown that prevalence rates vary substantially depending on whether postpartum depression is diagnosed using structured clinical interviews or high scores on depression self-report inventories, with the use of self-report inventories resulting in prevalence rates as high as 33%. The prevalence of postpartum depression is lower in cultural groups in which there is a high level of support given to new mothers.

RISK FACTORS

The strongest predictors of postpartum depression are a previous history of psychiatric disturbance, psychiatric disturbance during pregnancy, poor marital relationship, lack of social support, and stressful life events, including both major events and ongoing child care stressors. Other documented risk factors for postpartum depression include obstetric complications, worries about infant health, problematic infant behavior (e.g., colic), and emotion-focused (versus task-focused) coping styles. Demographic variables, such as educational level and parity, do not correlate with postpartum depressive symptoms, although some studies have found that women who do not work outside of the home are overrepresented in samples of women with postpartum depression, and recent studies suggest that postpartum depression is more common in very young or very old mothers. Contrary to popular opinion, there is little evidence that abnormal levels of hormones or changes in hormone levels following childbirth are associated systematically with postpartum depression.

IMPACT ON CHILD DEVELOPMENT

Infancy is a critical period of time in which the mother-child relationship provides a scaffold for children to develop emotion regulation and attachments with others. Depressed mothers often have difficulty providing responsive and predictable care to their infants, and depressed mother-child interactions are often characterized by less positive affective expressions than nondepressed mother-child interactions. Research has demonstrated that postpartum depression is associated with dysregulation, which is evidenced by decreased orienting behavior, depressed affect, and irregular sleep patterns. Postpartum depression is also associated with a high rate of preoccupied

attachment, behavioral problems, and cognitive delays in young children. Moreover, postpartum depression puts women at risk for experiencing future depressive episodes, and research has demonstrated that maternal depression is associated with child abuse, impairments in cognitive development, behavioral problems, and symptoms of psychopathology in older children. However, research shows that infants have the capacity for resiliency and may only experience adverse effects of postpartum depression if their mother's depression does not abate during the first year. Mothers who maintain high levels of warmth and sensitivity despite experiencing depressive symptoms decrease the likelihood that their children will have emotional and behavioral difficulties.

EFFECTIVENESS OF INTERVENTIONS

There is concern about treating postpartum depression with antidepressant medications during the period in which mothers are breast-feeding because research suggests that metabolites of some medications are available in the breast milk, and the physiological and developmental effects of these substances on infant health generally are unknown. Although antidepressant medications, particularly selective serotonin reuptake inhibitors, are prescribed for moderate to severe postpartum depression, researchers have focused on developing alternative psychosocial interventions to reduce risk for adverse health outcomes in breast-feeding mothers. Small outcome studies have provided preliminary evidence that psychoeducation, supportive group therapy, and cognitive behavioral therapy are effective in treating postpartum depression. A new psychosocial treatment is being developed that involves group therapy for mothers and infants, both separately and together in pairs to facilitate bonding. The largest outcome study to date found that interpersonal psychotherapy (IPT) was more effective than no treatment in reducing depressive symptoms and improving psychosocial functioning in community women with postpartum depression of mild to moderate severity.

SUMMARY

Postpartum depression is a major depressive episode that women experience in the period following childbirth. Infants whose mothers are depressed often exhibit a range of emotional, cognitive, and behavioral difficulties, although the effects of postpartum depression are lessened if the episode is relatively brief. Postpartum depression responds well to treatment, particularly psychosocial treatment with an interpersonal focus. Although women who experience postpartum depression are distressed, only infrequently is postpartum depression associated with catastrophic consequences, such as harm to the infant.

—Amy Wenzel

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POSTTRAUMATIC STRESS DISORDER (PTSD)

Posttraumatic stress disorder (PTSD) is defined as a set of characteristic symptoms that occur following exposure to an event that seriously threatened the life of the individual or someone very close to that individual. The characteristic symptoms include horror, fear, or helplessness. Re-experiencing the event, avoidance of anything associated with the event, and symptoms of arousal (e.g., distractibility, hypervigilance) that were not present before the traumatic event are also necessary to obtain a diagnosis of PTSD. For a clinical diagnosis, the symptoms of re-experiencing, avoidance, and arousal must have been present for at least 1 month to obtain a diagnosis. The diagnosis is considered acute if the duration of the symptoms lasts fewer than 3 months (this occurs about 50% of the time) and chronic if the

symptoms remain for longer than 3 months. The symptoms must also cause significant impairment in at least one major area of functioning (e.g., school, work, home) to qualify for a diagnosis.

PREVALENCE

PTSD symptoms can occur at any age across the life span following a traumatic event. Lifetime prevalence rates for PTSD range from 1% to 14%, whereas at-risk populations, such as war veterans, have prevalence rates ranging from 3% to 58%. Studies have found that as many as 25% of children have experienced at least one potentially traumatic event. Occurrences such as exposure to war, family violence, natural disaster, rape, or serious illness or injury have been associated with PTSD symptoms and diagnoses. A higher incidence of PTSD symptoms has been found for females than males in both pediatric and adult samples.

Prevalence rates vary depending on the types of trauma experienced. Children who have sustained a serious injury have had rates of 16% to 23%, children who have been victims of abuse have had rates of 36% or higher, female rape victims have had rates of 32%, and children who have been witnesses to domestic abuse have had rates of 56%.

ETIOLOGY

There is some evidence that PTSD is heritable among family members. In addition, preexisting or comorbid psychopathology has been related to longer duration and greater severity of PTSD symptoms.

Developmental Considerations

Children and adolescents are more vulnerable to environmental hazards than adults, such that direct trauma to the central nervous system may have long-lasting and possibly permanent effects on their future development. Exposure to such trauma may predispose these individuals to become more vulnerable to future distress, and even normal developmental changes may seem overwhelming for these individuals. In addition, cognitive development also may influence PTSD, in that younger children, who tend to use less effective reasoning strategies, are more likely to assume that they were at fault for a traumatic event and are less likely to use effective coping strategies.

TREATMENT

Cognitive-behavioral therapy (CBT) appears to be the most effective treatment for children and adults with PTSD. For example, one cognitive-based treatment for child- or adolescent-onset PTSD involves the use of a multimodality trauma treatment protocol (MMTT). According to this treatment model, symptoms of PTSD are viewed as an unconditioned response to the trigger symptoms, the conditioned stimuli. The more manual treatment involves the use of storybooks, narratives, cognitive games, and peer modeling for the affected individual to habituate to the anxiety associated with the conditioned stimuli. In addition, trauma-induced schemas are addressed, and strategies are developed for coping with emotions related to the event. Treatment with this intervention has been associated with significant improvement in PTSD symptoms that have been maintained up to 6 months after treatment. In addition, CBT has been demonstrated to be significantly more effective than nondirective supportive therapy in reducing PTSD symptoms in groups of sexually abused preschoolers over the long term. Exposure techniques, such as in vivo or imaginal flooding or gradual exposure, have also been successful in reducing PTSD symptoms. These techniques involve repeated exposure to cues associated with the traumatic event, paired with relaxation exercises, in an attempt to remove the negative emotions from the trauma-associated stimuli. Psychopharmacologic treatment for PTSD, which is often conducted in conjunction with CBT, may involve the use of antidepressants, such as monoamine oxidase inhibitors (MAOIs), tricyclic antidepressants (TCAs), and selective serotonin reuptake inhibitors (SSRIs). MAOIs may reduce symptoms of re-experiencing, avoidance, and arousal. SSRIs typically have few negative side effects and reduce a wide range of symptoms; however, they may take up to 6 weeks to reach therapeutic levels. In addition, medications for sleep may be necessary, especially when nightmares are frequent.

—Sunnye Mayes and Michael C. Roberts

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POVERTY

Childhood poverty is an issue of concern for policy makers, scientists, and the nation at large. Nearly 2 of every 10 children in the United States live in poverty today, and as many as 1 of every 3 children will spend at least 1 year of their life in poverty. Compared with their nonpoor peers, poor children are at higher risk for developing health, achievement, and social-emotional problems. Understanding this risk requires attention to the demographics of poverty in the United States, the causal mechanisms that result in poverty, and social policies aimed at alleviating negative outcomes for poor children and their families.

INCIDENCE

Poverty is ubiquitous, affecting families across the country of varying structures, ethnicities, and employment statuses. Further, the gap between the wealthiest and poorest in the nation has steadily increased since the 1960s. Using the U.S. Census Bureau's poverty index, for which a family is classified as poor if their annual income is less than their annual financial needs, the nation's poverty rate is currently highest in the South (13.8%) and lowest in the Midwest (10.3%). Although a disproportionate number of the nation's poor live in major metropolitan areas, poverty exists in both suburban and rural areas, with about 9% and 14% of people living in these areas being poor. Risk is greatest among black and Hispanic families and female-headed households. Yet, even as many as 10% of white families and more than 12% of single-parent, male-headed households are poor. In addition, nearly 38% of the poor are employed.

Chronically poor families who are continuously dependent on public assistance are the exception rather than the rule; most families' poverty experiences are relatively short (i.e., 1–3 years). Nonetheless, the risk for being poor remains high for children (younger than 18 years), and they are at greater risk for living in poverty than any other age group.

CAUSES

Causes of poverty generally fall into two categories: (1) macroeconomic forces that affect the distribution of income across the population at large; and (2) family-level processes that affect the economic well-being of individual families. From a macroeconomic perspective, increased numbers of immigrant families with language and educational barriers, increased participation of women and young workers in the labor market, and technological advances that have magnified earning differences between more- and less-educated workers are some factors associated with an increasing income disparity in the United States. Within families, income is often in flux over the life course, especially for lower-income families, who are likely to experience multiple transitions into and out of poverty.

Employment and family composition changes such as divorce and remarriage are two family-level processes that may cause transitions into or out of poverty. For example, decreased earnings (e.g., due to

job loss) for fathers and changes in family structure from two- to single-parent households are two of the most frequently occurring precursors to families falling into poverty. On the other hand, increased earnings for both fathers and mothers (in both two-parent and single-parent families) are the most common life events that help lift families out of poverty.

CONTEXT OF POVERTY

Children living in poor families experience a multitude of poor-quality living conditions and negative life events that accompany their financial deprivation. Children living in poverty are, for example, more likely than their nonpoor peers to live in single-parent and less-educated households. Housing quality is also likely to be deficient with regard to size, lighting, exposure to environmental hazards (e.g., lead paint), and general integrity. Further, these children are more apt to live in overcrowded, impoverished neighborhoods with higher rates of joblessness and crime as well as lower-quality schools compared with the neighborhoods in which middle-class children are apt to live.

IMPACT ON CHILD WELL-BEING

One of the most consistent findings in the human development literature concerns the association between childhood poverty and negative developmental outcomes. Recent literature reviews highlight four primary findings with regard to the negative effects of poverty on child development: (1) poverty affects child functioning in most areas of development, although effects are greater for cognitive and language achievement than for physical and mental health; (2) poverty experiences during early childhood have greater effects compared with impoverishment during later life stages; (3) effects become increasingly negative the longer children live in poverty; and (4) effects are transmitted to children through family investments and family stress.

Physical health risks associated with childhood poverty include elevated blood lead levels, chronic illness, and growth retardation. These early problems are, in turn, risk factors for later developmental problems, including increased risk for lowered intelligence, school failure, and obesity. Poverty is also associated with mental health problems in childhood and beyond. Poor children are, for example, more likely than nonpoor children to have both internalizing (e.g., depression) and externalizing (e.g., aggression) behavior problems. Beyond these health problems, poverty poses the greatest risk to children's cognitive and language development and ultimately limits their success in school.

On average, poor children score lower than nonpoor children on cognitive, language, and intelligence tests, even within the first 3 years of life. Compared with their nonpoor peers, poor children are also more likely to be retained in school (i.e., repeat grades), be placed in special education classes, and quit school before graduation. These differences appear to be greatest when children experience economic deprivation early in life, particularly during the preschool years. Further, the longer children remain poor, the greater the achievement gap between these children and their nonpoor peers.

Family income affects achievement and physical health primarily through investments. Having more money is, for example, associated with parents' abilities to buy more learning materials such as books and higher-quality goods such as foods higher in nutritional value that support children's cognitive and language development. On the other hand, family income affects child mental health primarily through social relationships such as the parent-child relationship. More specifically, the stressful context of poverty is associated with parent mental health problems like depression. These mental health problems, in turn, make parenting a more difficult task, with parenting often becoming inconsistent and less warm when families fall into poverty. Such parenting practices then lead to child behavior problems.

SOCIAL POLICY AND INTERVENTION

In 1996, the Personal Responsibility and Work Opportunity Reconciliation Act was signed into law. Replacing the Aid to Families with Dependent Children program, the 1996 welfare reform aimed to reduce poverty in the United States, primarily by giving states increased flexibility to design their own welfare programs, promoting marriage for poor single parents, and requiring welfare recipients to move from public assistance to work. In general, there have been increases in employment rates among poor families and decreases in child poverty rates since the 1996 reform, although it remains controversial to what extent these changes can be attributed to welfare

reform, per se, and to what extent these changes also reflect general economic trends. From a child development perspective, the success of welfare reform for improving the well-being of children appears to hinge on whether or not families experienced income gains.

For most children, transitions from welfare to work appear unrelated to developmental outcomes, possibly because many welfare families moved into low-paying jobs and, as such, did not experience financial gains. In fact, experimental evaluations of welfare policies in which families have been randomly assigned to conditions including work requirements without income supplements or work requirements with income supplements have demonstrated that increased employment is likely to improve children's life chances, but only when families increase their economic well-being. These findings have been corroborated in nonexperimental studies demonstrating that income gains can lead to improved achievement and mental health for children living in poverty.

Publicly funded early intervention programs have also been used to mitigate the negative effects of poverty on children's development. Most of these intervention programs, such as the federally funded Head Start and Early Head Start programs, include comprehensive services for children and their families. For example, in addition to high-quality educational services, Head Start programs provide poor preschool-aged children and their families with health, nutrition, and social services. By so doing, early intervention has generally focused on improving children's life chances both directly (e.g., through increased literacy education) and indirectly (e.g., through improved home environment). Indeed, early intervention is associated with cognitive, language, and social-emotional improvements as early as 3 years of age. Further, early intervention participation increases the probability that children born into poverty will graduate from high school and gain employment as young adults, thus decreasing the probability that their children will grow up poor.

—Eric Dearing and Christine Wade

See also Malnutrition, Social Security

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PREGNANCY

Pregnancy is a period of intense and rapid development for both the mother and the fetus. Physiologically, anatomically, and psychologically, the rapid transformation of an embryo into an infant and of a woman into a mother is unparalleled. Although not a comprehensive review of pregnancy, this chapter discusses maternal and fetal development in each of the three trimesters, considering the physical and psychological changes that take place.

TRIMESTER 1: WEEKS 1 TO 12

The first sign of pregnancy for most women is a missed menstrual period. Other early signs of pregnancy are tenderness of the breasts—a tingling sensation and special sensitivity of the nipples—and nausea and vomiting (called *morning sickness*, although it may occur at any time of the day). More frequent urination, feelings of fatigue, and a need for more sleep are other early signs of pregnancy. A wide variety of reactions may follow the discovery of a pregnancy. For the woman who has been trying to conceive for several months, the reaction may be joy and eager anticipation. For the teenager who does not feel ready to become a mother, the adult woman who does not want to have children, or the adult woman who feels that she already has enough children, the reaction may be negative—depression, anger, and fear. The presence

of a supportive social network is particularly important for such women at this time. The decision to end or continue the pregnancy is typically made within the first trimester.

The relationship between the mother and her partner may begin to change after the discovery of pregnancy. Although a range of patterns and frequencies in sexuality is normal, sexual desire and activity may decrease during pregnancy. Most women attribute this change to fatigue. Expectant fathers are sometimes initially ambivalent about their approaching father role, but trends in North America show fathers becoming more involved in parenting and childbirth preparation. For the couple eagerly awaiting the birth of their new baby, pregnancy can be a time of increased intimacy and relationship satisfaction.

The basic physical change that takes place in the woman's body during the first trimester is a large increase in the levels of hormones, especially estrogen and progesterone, which are produced by the placenta. Many of the other physical signs of the first trimester arise from these endocrine changes. The breasts swell and tingle, resulting from the development of the mammary glands, which are stimulated by the hormones, and the nipples and areolas may darken and broaden. There is often a need to urinate more frequently, which is related to changes in the pituitary hormones' effects on the adrenals, which in turn change the water balance in the body so that more water is retained. The growing uterus also contributes by pressing against the bladder. About 75% of women experience morning sickness, which may be due to high levels of estrogen irritating the stomach. Vaginal discharges may also increase at this time, partly because of the increased hormone levels, which change the vaginal pH, and partly because the vaginal secretions are changing in their chemical composition and quantity. The feelings of fatigue and sleepiness are probably related to the high levels of progesterone, which is known to have a sedative effect.

The development of the fetus during the first trimester is rapid: the small mass of cells implanted in the uterus develops into a fetus with most of the major organ systems present and with recognizable human features. During the third and fourth weeks, the head undergoes a great deal of development as the central nervous system begins to form, and the beginnings of eyes and ears are visible. By the end of the 10th week, the eyes, ears, arms, hands, fingers, legs, feet, and toes are completely formed. By the end of the 7th week, the liver, lungs, pancreas, kidneys, and intestines have formed and have begun limited functioning. Although the gonads have also formed, the gender of the fetus is not clearly distinguishable until the 12th week. From this point on, development consists mainly of enlargement and differentiation of structures that are already present.

TRIMESTER 2: WEEKS 13 TO 26

During the fourth month, the woman becomes aware of the fetus's movements, known as *quickening*. Many women find this to be an exciting developmental milestone in their pregnancy. In addition, the experience may lessen anxiety about a miscarriage. Around the same time, the physician or midwife can detect the fetal heartbeat. The mother is made even more aware of the pregnancy by her rapidly expanding belly. Some women feel that it is a beautiful and powerful symbol of womanhood; other women may feel awkward and resentful of their bulky shape and may feel insecure about their physical attractiveness.

Most of the physical discomforts of the first trimester, such as morning sickness, disappear in the second trimester. For this reason, the second trimester is usually a period of relative calm and well-being. As a result of the mother's physical changes, constipation (caused by increased progesterone, which inhibits smooth muscle contraction) and nosebleeds (caused by increased blood volume) may occur. For some women, edema may be a problem in the face, hands, wrists, ankles, and feet; it results from increased water retention throughout the body.

By about midpregnancy, the breasts, under hormonal stimulation, have essentially completed their development in preparation for lactation. Beginning about the 19th week, a thin amber or yellow fluid called colostrum may come out of the nipple. Around this same time, the fetus first opens its eyes. By about the 24th week, the fetus is sensitive to light and can hear sounds in utero. Arm and leg movements are vigorous at this time, and the fetus alternates between periods of wakefulness and sleep. These patterns are detected by the mother, whose bond to her developing fetus may strengthen as she becomes more acquainted with its activity.

Throughout pregnancy, it is important that the mother obtain adequate nutrition to support herself and her fetus. Folic acid, calcium, iron, vitamin A, magnesium, and protein are important for maintaining the mother's health and fostering the healthy

development of the fetus. Some drugs, such as antibiotics, alcohol, cocaine, marijuana, nicotine, and some prescription drugs, may adversely affect fetal development and lead to birth defects, preterm labor, or even miscarriage.

For about 10% of women, pregnancy may be accompanied by depression. Although women with a history of depression are at increased risk for depression during pregnancy, the depressive episode during pregnancy is the first such episode for about one third of depressed pregnant women. Other risk factors include poor marital quality, inadequate social support, low socioeconomic status, an unwanted pregnancy, and negative life events. Depression during pregnancy increases risk for health problems during pregnancy (e.g., poor fetal weight gain, drug use, and noncompliance with health care) and in the postpartum (e.g., child cognitive, social, emotional, and health problems, as well as postpartum depression). Although the U.S. Food and Drug Administration (FDA) has not approved the use of antidepressant medications during pregnancy, many studies suggest that some antidepressants may safely treat depression during pregnancy.

TRIMESTER 3: WEEKS 27 TO 38

The mother's uterus is very large and hard now, which puts pressure on her other organs and may cause some discomfort. The pressure on the lungs may cause shortness of breath. The stomach is squeezed, often leading to indigestion. The heart is also somewhat strained by the large increase in blood volume. Sleep can also be difficult because of the increased size of the uterus and increasing activity level of the fetus. These physical changes are often accompanied by a further decrease in sexual desire on the part of the mother because the mother's shape may make sexual intercourse uncomfortable at this time.

The weight gain of the second trimester continues in the third trimester, sometimes causing a disturbance in the mother's sense of balance and an increase in lower back pain. Although women typically gain 20 to 30 pounds during pregnancy, excessive weight gain can be a sign of gestational diabetes. Regular aerobic exercise during pregnancy can improve or maintain physical fitness and has not been conclusively shown to be associated with any risks. At the end of the 8th month, the fetus weighs an average of 2,500 grams. The average full-term baby weighs 3,300 grams and is 50 centimeters long.

During the seventh month, the fetus turns in the uterus to assume a head-down position. If this turning does not occur by the time of delivery, there will be a breech presentation. Women can do certain exercises to aid the turning. Physicians and midwives can also perform certain procedures to turn the fetus. Moxibustion (a technique used in Chinese medicine) can be performed by an acupuncturist to aid turning as well. In the last month, the fetus will begin to descend into the pelvis (called *engagement*), sometimes creating slight discomfort in the perineum. During the third trimester, the uterus may also tighten occasionally in painless contractions (called *Braxton-Hicks contractions*). Although not a part of labor, these contractions may help strengthen the uterine muscles in preparation for labor.

CONCLUSION

A mother and her developing fetus experience tremendous and rapid development during pregnancy. As adequate prenatal care and nutrition contribute to the healthy development of the fetus, a supportive social network contributes to the psychological well-being of the mother.

—Nicole M. Else-Quest and Janet Shibley Hyde

See also Gamete, Ultrasound

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PRENATAL DEVELOPMENT

Prenatal development can be divided into three stages: preimplantation, embryonic, and fetal. The

preimplantation period, between fertilization and implantation of the conceptus in the uterine wall, takes an average of 7 days. The embryonic period is considered to be the major period of organogenesis, lasting about 2 months from conception. During the fetal period, lasting until about 38 weeks after conception, growth, functional maturation, and further differentiation of tissues occur.

The prenatal period is highly sensitive to disruption by toxic substances because of the high rate of cell division and the intricate and complex coordination among chemical, cellular, and genetic processes that is necessary for normal development. Toxic insults to the conceptus are thought more likely to be lethal during the preimplantation and embryonic periods than the fetal period. The timing of an exposure or event has a dramatic influence on the developmental effects that will likely result. For example, alterations of hormones such as prostaglandins and the progesterone–estrogen balance can prevent implantation, resulting in embryonic death. During organogenesis, when the molecular, cellular, and morphological structural organization of tissues and organs takes place, the embryo is considered to be most susceptible to structural defects. Animal experiments show that the exact timing of exposure to a teratogen affects the pattern of structural malformations. However, malformations usually occur in more than one organ system because of overlap in the sensitive period of development of different systems. Functional effects and growth retardation, rather than malformations, are considered to be the most likely outcomes of toxic exposures during the fetal period. However, there are exceptions to these generalizations. For example, skeletal abnormalities in mice can be induced during the preimplantation stage.

Susceptibility to teratogens or other causes of untoward birth outcomes also depends on species, genetic characteristics, and the history of the mother herself. Examples of species and genetic influences on the effects of a teratogen are that mice and rats were found to be resistant to the induction of limb defects by thalidomide, whereas rabbits and hamsters showed variable effects, and some species of primates were highly sensitive to the teratogenicity of thalidomide. The life history of the mother can also affect outcome. For example, the sensitivity of the fetus to alcohol appears to increase with the age of the mother, and recent findings suggest second-generation effects of prenatal influences such as nutrition. A female child born during a famine is more likely to give birth to a low-birth-weight infant, regardless of her own nutritional during pregnancy.

Prenatal exposures can create behavioral and psychological effects by altering aspects of early brain formation such as cell proliferation, dendritic and axonal differentiation, neuronal migration, apoptosis (programmed cell death), synaptogenesis, and myelination. Exactly how alterations in these aspects of brain development create specific behavioral and psychological outcomes is unknown but being studied. Examples of disruptions of intracellular and extracellular processes that can affect brain development include altering ion channels, adhesion molecules on neural cells, hormonal concentrations and balance, neurotransmitter production, and oxidative stress. For example, methylmercury and lead are both thought to alter ion channel functioning and calcium distribution, which in turn may disrupt the neural architecture of the brain. Methylmercury also creates oxidative stress, which, in turn, can cause neural cell death. PCBs (polychlorinated biphenyls) are endocrine disruptors that may alter thyroid functioning of the fetus or mother. Maternal stress alters the levels of hormones such as cortisol, adrenocorticotrophic hormone (ACTH), and corticotrophic-releasing hormone (CRH), all of which can influence the development of the fetal hypothalamic-pituitary-adrenal axis and promote premature birth. In rodents, prenatal stress reduces male sexual behavior and increases emotional behavior in offspring. Insecticides and nicotine alter the concentrations of neurotransmitters that direct embryonic and fetal neural development and affect processes such as apoptosis.

The effects of prenatal toxicants also depend on the dose, the degree to which and form in which a substance is transmitted across the placenta to the fetus, and the developmental status of the fetus's ability to process the toxicant. Higher doses normally increase the likelihood of adverse effects. Transfer across the placenta depends partly on variables such as molecular weight and structure, protein binding, lipid solubility, and ionic charge. Once a potential teratogen enters the fetus, the detoxification of the substance depends on the maturity of the liver, kidneys, and metabolic and enzymatic processes. The toxicity of substances depends not just on initial chemical structure but also on metabolic transformation. For example, ethanol (the alcohol used in beverages) is converted into acetaldehyde, which is itself teratogenic.

The wide variety of potential toxic insults to the conceptus raises the importance of health care and information for pregnant women and women planning pregnancy. In 1985, the U.S. Institute of Medicine concluded that prenatal care is important for the prevention of low birth weight and recommended policies to make prenatal care available to women regardless of eligibility for public aid. Because low birth weight is a risk for a wide range of development problems, including infant mortality, prevention is important. Low birth weight can result from either premature birth or intrauterine growth restriction. In the two decades following the recommendation, the infant mortality rate in the United States fell. Whether this is due to improvements in prenatal care, improved neonatal critical care, or both is unclear. Some segments of the population have not benefited from these policies as much as others. In particular, African Americans with income below the poverty line have higher rates of low-birth-weight infants and higher infant mortality rates than the rest of the American population.

There is also some controversy about whether current prenatal care practices are truly effective in preventing low birth weight. Prenatal care should consist of early and continuing maternal and fetal risk assessment, health promotion, medical and psychosocial interventions, and follow-up. Late initiation of prenatal care (fourth month or later) is associated with higher rates of many types of congenital defects. This finding could be the result of preventative information or treatments during prenatal visits, or it could derive from the fact that late initiation of prenatal care is a signal for poor health behaviors, poor health care utilization, or poor health care availability.

Although one aspect of prenatal care is promoting health behaviors that are important for infant outcome, as many as one third of pregnant women are not advised about eliminating alcohol, tobacco, and illicit drugs during prenatal visits. To develop more effective prenatal care, future research requires better measures of prenatal care content, quality, timing, and prenatal care provider characteristics and training. Examination of the relations between specific components of prenatal care and child and maternal health and behavioral outcomes is also needed.

An emerging area of prenatal care is the prevention of the transmission of human immunodeficiency virus (HIV) to the fetus. HIV can be transmitted from mother to child during pregnancy, during labor and delivery, and after birth. Most mother-to-child transmission occurs during birth and delivery. The likelihood of perinatal transmission of HIV can be greatly reduced by antiretroviral drug therapy for the mother during pregnancy, treatment of the infant shortly after birth, and avoidance of breast-feeding. As a result of more vigorous prenatal HIV testing and counseling in the United States, between 1992 and 1996 the number of newborns diagnosed with HIV fell by more than 40%.

—Colleen F. Moore and Mary L. Schneider

See also Neonate, Preterm Infants

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PREOPERATIONAL THOUGHT

The young infant develops from an almost entirely reflexive organism to one that can intentionally manipulate symbols that represent objects in the real world. Imagine the tremendous amount of growth that is now possible, given these new tools for exploring and experiencing the environment. The child is no longer bound by perceptual experiences but can go beyond what the environment offers. The child is

progressing from a sensorimotor type of intelligence to a symbolic type of intelligence characteristic of the preoperational stage of development. Whereas the first was limited to direct interactions with the environment, the second is characterized by a manipulation of symbols that represent the environment—thus the beginnings of language. The onset and development of language is the most significant event during this stage.

IMPORTANCE OF OPERATIONS IN PIAGET'S THEORY

An operation is an action wherein an object or experience that was transformed can be returned to its original form. An operation is reversible. It is also an action that is performed mentally. The preoperational child is incapable of performing such operations, and this characteristic is a primary distinction between the preoperational child and the child in a more advanced stage of cognitive development.

The processes of addition and subtraction represent a good example of an operation. The fact that 2 plus 4 equals 6 is logically the same operation as 6 minus 4 equals 2 may seem obvious, but it is not obvious to the preoperational child. The preoperational child cannot mentally rearrange a sequence of events into the reverse order from that in which they originally occurred. One of the primary outcomes of Piaget's long and intensive research into this lack of "operationality" is the child's failure to conserve the relationship between different dimensions of an event. If one dimension of an experience changes (such as the shape of one of two pieces of clay), the preoperational child cannot understand how the mass, weight, or another dimension can remain the same. Technically, this is the invariance of one dimension while there is a change in another.

For example, in a conservation of number task, the child is presented with a row of objects (such as a row of pennies). The child is asked to construct a second row of pennies to match the first row exactly. What the child is being asked to do is to establish a type of perceptual equivalence between the two sets of objects. After this task is completed, the experimenter changes the spacing between the pennies in one row so that one row is shorter than the other. When asked which row then has more pennies, the child confuses the dimension of length with that of number and says that the row that is longer has more pennies in it. This is clearly a contradiction of what the child did earlier, when he or she matched each of the pennies in his or her own row with each of those of another row. Yet now the child believes that one row has more pennies than the other. This is a good example of how the child's use of language at this age reflects an immature level of thought.

Conservation of mass tasks are similar in design. For example, a child will be given two balls of clay that are exactly the same shape and size. The experimenter forms one of the balls into another shape (e.g., from a circle to a sausage). Again, the child believes that the mass of the two are now different and that one is "more" than the other. In fact, the child cannot reverse the process that has taken place or mentally make the comparison between the two shapes before and after the manipulation took place.

The preoperational child cannot conserve or understand that just because one dimension of an experience is changed, other qualities of that experience do not have to change as well. The preoperational child has a difficult time simultaneously relating two dimensions of a situation to one another. For example, the preoperational child cannot understand how she can be both a "good girl" and someone's "little sister." In other words, the child does not yet possess the cognitive structures necessary to recognize that a change in one dimension of an experience does not necessarily mean a change in the others. Because of this, the child is still somewhat perceptually bound and cannot manipulate symbolic elements in a reversible sense. In essence, the child believes that what you see is what you get.

EGOCENTRISM IN THE PREOPERATIONAL STAGE

The most important aspect of this phase of intellectual development is the child's increasing use of symbols to represent objects and the development of a complex and sophisticated system of language. It is no surprise that the primary task the child is faced with in the developmental course of egocentricity is the conquest of the symbol. Now that the child has been separated from the world of sensorimotor egocentrism and can distinguish between self and external objects, the next task is differentiating between symbols and their referents. In other words, the child's world is a function of the way in which the child chooses to represent the world. The child cannot assume another perspective than his or her own, and it is doubtful whether the child even knows another perspective exists.

Piaget and his colleagues developed an ingenious task called the *three-mountain task* to examine this lack of perspective by preoperational children. Depending on one's position around the table, one sees a different view of the three mountains. For example, view A reflects a configuration seen from seat A. The child is seated at one of four positions, and a doll is placed at one of the other positions. The child is then asked to choose the picture that the doll sees from a set of pictures representing all possible views. If, for example, the doll was sitting in seat D, the correct response would be view D. Preoperational children almost invariably choose the view that represents their own position rather than that of the doll. This illustrates that the preoperational child cannot assume a perspective other than his or her own. In contrast, the older child almost never fails at this task, and, if incorrect, the error will not be egocentric but nonegocentric, such as choosing view C or view B.

Another dimension of preoperational egocentrism is the way that language is used. Although Piaget believes that language is a necessary prerequisite for the development of adaptive behavior, language alone is not sufficient. Language has some obvious advantages over sensorimotor functioning, such as the more rapid speed with which events can be processed. However, without the structural changes that take place at this time, language cannot be a primary component of logical thought. Language serves the important function of manipulating and rearranging different symbols (and experiences) without the inefficiency of direct physical activity, but language is restricted by the illogical rules the preoperational child applies to it. The preoperational child uses language in an extreme literal sense. For example, he or she may be confused by a statement such as "He has grown a foot," thinking that indeed someone has actually grown another foot.

The preoperational child also illustrates what Piaget calls egocentric speech, in which there is no differentiation between the child and other people. Even though the child is talking with other children, there is a collective monologue wherein no meaningful transmission of information takes place. Language progresses during this period from being basically egocentric, whereby the child's verbalizing has no real communicative purpose (that is, he or she talks at instead of to other people), to sociocentric or socialized speech, where the communication consists of transmitted information.

Egocentric language parallels the way preoperational children follow rules while playing. Even though they often do not follow the rules, they insist that they are correct. Given that the only set of rules they are aware of is their own, it is logical for them to believe these rules are correct. When two preoperational children play a simple game with each other, each of them changes the rules as they go along to fit his or her personal needs. They are playing for themselves and have no knowledge that a set of outside rules might apply to their behavior.

The preoperational stage is a distinct turning point in the course of cognitive development. For the first time, thought becomes a symbolic process for understanding the world. The most obvious example of this is the development of language.

The world of the preoperational child is bounded by direct contact with concrete objects. The child benefits most from experiences with nonabstract elements and events because his or her ability to manipulate events or objects that are not directly tied to perceptual experiences is limited. The child cannot reverse an operation and has difficulty understanding the importance of cause-and-effect relationships in solving certain types of problems.

The preoperational child is in a transitional period. Although his or her perspective on the world expands rapidly, there is still some confusion in the evaluation of cause and effect. The child makes inappropriate generalizations and attributes his or her feelings to inanimate objects, assuming, for example, that clouds cry to make rain.

—Neil J. Salkind

See also Concrete Operational Period; Formal Operational Period; Piaget, Jean; Sensory Development

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PRESCHOOL YEARS

The preschool years, from about 2 to 5 years of age, is a period of remarkable intellectual (cognitive),

social, and physical development. It is an age of both amazing abilities and surprising limitations in the ways in which preschool children interact and understand their expanding world. Consider the following scenario from a *false belief* task designed to show what preschool children understand about thinking. Sally, a 3-year-old, is asked what she believes is in a box of crayons. Naturally, she replies "crayons." Next the box is emptied to reveal that there are really candles inside. When the candles are then placed back in the box and she is asked what she first thought was in the box, she answers "candles." She further believes that someone who has never looked inside the box also thinks as she does that there are candles in the box. She does not understand that there can be two different beliefs about the same situation. However, only 18 months later, she will be able to answer such questions. This ability to distinguish conflicting beliefs will affect Sally's participation in social spheres, such as interactions with peers and family members. As this example illustrates, preschool children often misunderstand many aspects of their world, but the development of their understanding quickly blossoms and intersects other facets of their development.

PHYSICAL DEVELOPMENT

The typical 3-year-old weighs about 23 pounds and is a little over 2½ feet tall. By 6 years of age, the child's weight has increased to 50 pounds and height to almost 3½ feet. Of course, as with all aspects of development, there is enormous variability reflecting both biological influences, such as heredity, and environmental influences, such as nutrition and disease. Children's motor skills continue to develop and become more refined and elaborated from infancy. Preschoolers become more coordinated at being able to move around their expanding world. They can run, jump, and climb. Further, they continue to improve in their ability to handle and manipulate objects, such as throwing and catching a baseball or dribbling a basketball.

One of the most significant physical developments is the brain's continued rapid growth that began during the prenatal period. Its continued growth during the preschool years is responsible for many of the cognitive and social changes that take place. In terms of size, by 3 years of age, the brain has reached 80% of its adult weight. Two fundamental processes of brain development that continue during the preschool period are *synaptogenesis* and *myelinization*. Synaptogenesis reflects the formation of synaptic connections between neurons and allows the different areas of the brain to communicate with each other, allowing for more coordinated and sophisticated behavior. The rate of synaptogenesis varies across different brain areas. Synaptogenesis of the prefrontal cortex, responsible for many executive functioning skills, such as planning, peaks at about 4 years of age, whereas synaptogenesis in the visual cortex peaks several years earlier. Interestingly, the elimination of unused neural pathways also occurs across the preschool period. Myelinization refers to the covering of axons with myelin—an insulating sheath that affects the speed of information processing between neurons (brain cells)—and continues to occur during the preschool period. As the brain matures, different areas become *lateralized,* or specialized for different functions. For instance, the left hemisphere becomes increasingly specialized for language. However, during early development, the brain also exhibits *plasticity*—the ability to recover from damage or injury by having other areas take over other functions. As children get older, the degree of plasticity decreases, and thus it becomes more difficult to recover. The brain's development contributes to the many social and cognitive changes described below.

COGNITIVE DEVELOPMENT

Jean Piaget

Perhaps no one has done more to describe the preschool mind than Jean Piaget, a psychologist and biologist who devoted his life to understanding the different stages of cognitive development from infancy to adulthood. Piaget was one of the first to note both the enhanced cognitive abilities of the preschool child compared with the infant and the limitations of the preschool child compared with the elementary school child. According to Piaget, the hallmark of the preschool child is *symbolic* thought. One of the most dramatic indications of symbolic abilities is children's use of words to represent concepts, such as the understanding that the word *dog* represents the entire category of dogs and not simply the one in the back yard. Another symbolic function is *pretend play*, when children begin to use other objects to represent another. Typical examples would be a child using a block to represent a car, or despite the best efforts of parents, using a stick to represent a gun. Children also

are capable of *deferred imitation*—witnessing a model perform an action and then imitating it at a later time point.

Piaget was struck by the illogical or limited nature of preschool thought as well. He referred to the preschool period as the *preoperational* or prelogical stage. The best known illustration of this limited thinking is preschoolers' misunderstanding of *conservation*—that the quantity of objects does not change despite changes in appearance. In the conservation of liquid problem, children are shown two glasses of the same size with the same amount of juice in each. As the child watches, the juice from one of the glasses is poured into a taller, thinner glass. The child now thinks the taller beaker has more juice than the original shorter one because they can only focus on the more salient perceptual dimension of height and are unable to understand that the greater height is compensated by a smaller width. Parents often have to struggle with this misunderstanding as they try to hand out equal shares of cookies and juice.

This inability to focus on only one dimension is also reflected in difficulties with *perspective taking*. Preschool children often have difficulty understanding that another person's visual perspective or social perspective is different from their own. In Piaget's classic three-mountain task, children are shown a model of three mountains with different objects on the different sides. As the child is seated on one side of the display, the child is asked what a person on the other side sees. Preschool children respond that the other person sees the same objects that they do. Similarly, they have difficulty understanding that an adult would want a different birthday present than they would—a reflection of *egocentric* or self-focused thought. Often, however, changes in testing demands can improve preschoolers performance on all of these tasks, and some researchers have argued that preschoolers are not as limited in their thinking as Piaget's original work suggested.

Theory of Mind

This pattern of strength and weakness is characteristic of many aspects of preschoolers' cognitive development. Nowhere is this more evident than preschoolers' understanding of the mind or their *theory of mind*. Theory of mind refers to children's understanding of mental states (e.g., emotion, desires, and beliefs) and how these are related to behavior. This ability is a fundamental component of understanding social interactions, such as knowing where someone will look for their keys based on where they think the keys are rather than the actual physical location of the keys. Preschool children understand many different aspects of the mind. Initially, children understand mental states such as *desires* by 2 and 3 years of age. They can predict someone's behavior from knowing their desire, for example, predicting that a child will go to the cookie jar to get a cookie if the child wants one. In addition, 3-year-olds know that different types of perceptual experiences lead to different types of knowledge. They understand that someone who can look inside a box will know what is inside of it, whereas someone who cannot see inside will not. Although they can understand desires, they cannot fully understand beliefs until about 5 years. As the crayon box *false belief* example illustrated, children before age 5 do not understand that people (including themselves) can have different or conflicting beliefs. Once they understand this, however, they learn how to surprise and deceive other people. Similar to this difficulty in understanding beliefs, it is not until about 5 years of age that children understand the *appearance–reality* distinction, recognizing that appearances may mask a different reality. For example, young preschool children are often frightened by people wearing masks or have problems recognizing that someone may appear happy but really be sad. Autistic children have particular difficulty in understanding the mind, which may account for their difficulties in social interactions.

Language

Perhaps there is no area of cognitive development in which children make more progress than language during the preschool years. It is one of children's most remarkable intellectual achievements. During this period, their vocabulary expands rapidly, so that by the time they are 5 years of age, their vocabulary may number 5,000 to 10,000 words. Children's word meaning reflects the concepts that they are acquiring. Preschoolers use a variety of learning strategies to learn word meanings that primarily involve understanding the communicative intentions of others.

Perhaps the most impressive language achievement of the preschool period is the development of a *grammar*—a system of rules for combining words and morphemes (e.g., the past tense marker of *-ed*). The rules of any language are very complex and subtle, and yet children are able to acquire them effortlessly

with no direct instruction. Children do make language errors as they acquire their grammar, but these are creative errors reflecting children's ability to extract rules from the language they hear around them. The best illustration of this is the *overregularization* of grammatical morphemes. This occurs when children misapply a rule, for example, adding an *-ed* ending to an irregular verb form, producing words such as *goed* or *wented*. Despite such errors, by the end of the preschool period, children have mastered many of the grammatical rules of language. So impressive is children's skill at learning grammar, that some have proposed that children have innate knowledge of particular linguistic principles common to the world's languages, referred to as *universal grammar*. Others argue that children's language can be explained by more general cognitive and social-cognitive mechanisms that children use in learning about all aspects of their world. This debate regarding whether children have innate, specialized abilities or use more general cognitive learning strategies occurs in other areas of cognitive development as well, such as theory of mind.

Regardless of which position is correct for language, it is clear that preschool children have an advantage over older children and adults in learning a language. It is much easier for preschool children to learn a first or second language than it is for older children or adults. This optimal period for learning language is often referred to as a *critical* or *sensitive period*, which begins to decline at about 6 or 7 years of age. If language learning is not accomplished during this period, it will be much more difficult, if not impossible, to acquire to a native proficiency of language later.

Memory

Thus far, preschool children's understanding of specific cognitive domains or concepts has been explored. There are also changes in more basic cognitive abilities and capacity. One of the most important is in the area of memory development. Information-processing approaches make a distinction between *short-term memory* and *long-term memory*. Short-term memory holds incoming information for a brief period of time before it is transferred to long-term memory, which is long lasting. Children's ability to remember short- and long-term information increases across the preschool years. For example, they can remember longer sequences of random numbers, reflecting an increase in short-term memory.

Two aspects of memory performance that may be particularly limited in the preschool years are *strategies* and *metamemory*. Most preschoolers are not very strategic. For example, if given a set of pictures to remember, most preschoolers will not spontaneously rehearse the picture labels or put them into categories. They can adopt simpler memory strategies to help them remember where a toy is hidden, for example, by staring at its location. The more deliberate or conscious strategies, such as rehearsal, develop later. Similarly, preschool children do not have a very sophisticated metamemory—conscious knowledge of memory and how it operates. Preschoolers may have difficulty knowing what memory tasks are easy or difficult and easily overestimate what they are capable of remembering.

Preschool children can use their knowledge to help them remember. This is most apparent in children's *scripts* for routine events. Scripts are generalized representations of everyday events such as going to a birthday party or going to preschool. Preschoolers can quickly form general memories of these events and recall them in a logically and temporally organized manner.

A significant memory achievement that occurs at about 4 years of age is an *autobiographical memory* system. Although even infants and young preschoolers can remember events, adults typically cannot recall experiences that occurred before age 3 or 4 years. This absence of early memories is referred to as *infantile* or *childhood amnesia.* There have been numerous explanations of the emergence of autobiographical memory at 4 years. One proposal is that children need to have established a *self-concept* to form personally significant memories. Another important contributing factor is *narrative skill*—the ability to tell a story about their past. Interestingly, parent-child interactions appear to be particularly critical to this development. As parents and children jointly discuss past experiences, such as vacations or birthday parties, children learn the narrative structure of how to talk about the past as well as the importance of the past to their own self-concept. Those parents who create elaborative narratives, using rich stories of the past, facilitate children's formation of autobiographical memories more so than parents who are less elaborative.

A related practical memory question is whether preschool children can provide accurate *eyewitness testimony* in court, which may be necessary in cases of abuse when children are the only witnesses. There is

some concern that preschool children are too suggestible and can be led to provide false testimony by the asking of leading questions by concerned parents and court authorities. Several high-profile convictions have been overturned because of these concerns. Research does indicate that preschool children are more suggestible than older children, although there is debate about how extensive this is and whether children can provide reliable testimony. Many researchers believe that under appropriate interview conditions, preschool children can give accurate testimony, whereas others urge caution.

Problem Solving

Many of the tasks described so far are actually examples of different types of problems that children learn to solve during the preschool years. As described by David Klahr, *problem solving* involves the development of strategies to overcome an obstacle to achieve a goal. One key to successful problem solving is *planning*. Preschoolers often have difficulty planning out a course of action and often proceed in a trial and error fashion, leading to frequent problem-solving failures. This inability to plan may reflect difficulty in inhibiting actions. Preschoolers tend to plunge ahead without developing a strategic plan. This difficulty in inhibiting an action is reflected in delay of gratification tasks, in which children must decide whether to wait and receive a larger award later or act now and receive a smaller award. Not surprisingly, most preschool children do not wait. The development of planning and inhibition broadly reflect the development of *executive function*—a broad constellation of skills that are thought to reflect the maturation of the brain's frontal lobes.

Finally, other basic processes that influence children's problem solving are *encoding* and *speed of processing*. In solving a problem successfully, it is necessary to encode or attend to the most important aspects of the problem. For instance, to solve Piaget's conservation of liquid problem, children must encode both the height and width of the beaker and not just the height. Preschool children often fail to encode or notice all the important dimensions, although training them to do so can facilitate their success. In addition, the speed with which children can perform basic processes increases dramatically over childhood, including the preschool years, reflecting both brain maturation and experience.

SOCIAL DEVELOPMENT

In addition to the amazing strides children experience cognitively, the preschool years are a time during which children's participation in social interactions also increases. Equipped with their newly improved cognitive abilities born out of social interactions with others, preschoolers become increasingly capable of interacting with other members of their family and forming relationships with members from their peer group. Unlike infancy, preschoolers' social worlds are multilayered and operate beyond that of the parent-child relationship. According to Urie Bronfenbrenner, social participation occurs at multiple levels, represented as concentric circles: microsystem, mesosystem, exosystem, and macrosystem. Thus, children's participation in their social world, such as that with peers and family members, is embedded within larger social contexts, such as their neighborhoods and communities and, ultimately, the attitudes and ideologies of the culture in which they live. The hallmarks of social development during the preschool years include (1) development of the self-concept, (2) role of parents, (3) forming peer relationships, (4) development of play, and (5) effects of day care.

Development of the Self-Concept

Between 18 and 24 months of age, children are able to recognize themselves in the mirror, as evidenced by their reaction to a spot of rouge surreptitiously placed on their nose. However, there is some debate as to whether this form of visual self-recognition truly reveals children's early self-understanding. Others argue that self-awareness continues to develop over the course of the preschool years, emerging as late as 4 years of age, evidenced by their ability to identify themselves on videotape.

This enhanced ability to recognize oneself is accompanied by changes in how children characterize themselves according to other dimensions, the most salient of which is physical characteristics, particularly gender, during the preschool years. Children also describe themselves in relation to what they like and dislike, such as food preferences, as well as items they possess, such as toys and pets. Typical instruments used to assess children's self-description involve interview procedures in which children are asked yes-or-no questions that assess characteristics of their

physical, social, and cognitive abilities. However, because children during the preschool years typically possess a heightened (and perhaps overinflated) view of themselves, it is difficult to ascertain the accuracy of their judgments related to their self-perception and self-worth during this time frame.

Perhaps the most central theme that runs through children's self-concept development during the preschool years is the role of gender. Initially, many children exhibit gender-stereotyped behaviors that meet the standard cultural roles prescribed by society. At the same time, children begin to develop *gender constancy*, a term that refers to the fixedness of stereotypically masculine and feminine characteristics, such as males are aggressive and females are emotional. Based on these gender stereotypes, children form schemas for gender-relevant behaviors. Interestingly, preschoolers' gender schemas play a significant role in their ability to recall events. Thus, girls and boys differentially recall gender consistent, as opposed to gender inconsistent, information. This illustrates again how knowledge affects memory. Finally, the role of gender stereotypes is evident in preschoolers' play, such that preschool-age boys' play is characterized as rough and tumble in nature, whereas preschool girls tend to aggregate in group conversations that are often in close proximity to teachers.

Role of Parents

Given their increasing independence cognitively, socially, and personally, it is not surprising that elements of family interactions also change during the preschool years. Individual differences in socialization within the family context, particularly in relation to the manner in which parents regulate their children's positive and negative behaviors, begin to emerge. Specifically, different parental styles emerge, known as authoritative, authoritarian, permissive, and disengaged. *Authoritative* parents are able to strike a balance between disciplining their child and still maintaining a sense of warmth and affection. In contrast, *authoritarian* parents are highly demanding and controlling, absent of warmth and affection. Permissive parents are very warm with their children, but lack effective control over their children's behaviors, whereas those who are *disengaged* are low in warmth and control.

Within the context of predominantly white, middle-class families, Baumrind's classifications of the different parenting styles in relation to positive developmental outcomes, such as success in school and popularity with peers, is linked to the authoritative parenting style, whereas the most negative outcomes are linked to the disengaged parenting style. Children of authoritarian parents tend not to do as well in school and experience behavioral difficulties in adolescence. Differences within other cultural and ethnic groups demonstrate, for example, that children from other countries, such as China, and African American children from the United States experience success in scholastic and social worlds best when exposed to authoritarian styles of parenting.

Parents also serve as social facilitators to enhance the nature of their children's peer interactions. Specifically, parents influence relations within the peer group by structuring opportunities for social interaction, such as play groups, and supporting their children to join clubs and sports teams, such as soccer. Further, parents serve as models of social interaction, from which preschoolers are able to base their manner of interactions with others. Research demonstrates that the extent to which preschoolers are rejected by their peer group is influenced by the communicative style of their parent. This suggests that parents' own abilities to engage in effective communicative interactions directly affect their children's ability to tune into the social, emotional, and linguistic cues of those with whom they interact.

Forming Peer Relationships

During the preschool years, children's concepts of friends shift. At 3 years of age, children typically have one peer of the same sex, which they consider a playmate. These playmates are typically selected based on similarities in play styles and children's ability levels, such as possessing similar linguistic skills. As children move through the preschool years, the quality of their interactions with their peers changes, in part because of children's enhanced cognitive capacity to engage in more quality interactions in play contexts. Besides facilitating play opportunities, peer relationships also serve other functions in preschoolers' lives, such as teaching cooperation and negotiation with others. The mastery of these skills during the preschool years affects children's developing self-concept and their future interactions with others.

Children's *sociometric status* (i.e., social status among peers) begins to increase in meaning by the end of the preschool years. Social status among peers

is studied by a peer nomination process in which children indicate, for example, the three children they would most like and least like to play with in their class. By age 5, groups of children are classified as *popular* (those capable of facilitating and maintaining positive interactions in the peer group), *rejected* (those actively rejected by their peers), *neglected* (those not acknowledged by their peers), or *controversial* (those who receive both positive and negative nominations from their peer group).

As children develop cognitively (e.g., theory of mind), they become increasingly capable of interpreting the social behaviors of those around them. Crick and Dodge discuss young children's capabilities to draw on their knowledge database to process the social information of those around them. Those children who are more effective interpreters of those with whom they interact experience more positive than negative social consequences. Further, those children who are considered more socially adept, specifically in the form of popularity, tend to be better consumers of the social information presented to them.

A special form of the peer relationship that buds during the preschool years is the sibling relationship. Because of their increased cognitive and linguistic skills, preschoolers become more capable of participating in quality interactions with their siblings, such as serving as social facilitators and managers of activities such as play and conversation. Preschoolers who are younger siblings or close in age to their older siblings experience a heightened awareness of theory of mind, likely owing to their participation in emotionally charged or deceptively laden interactions with their older siblings.

Development of Play

As previously discussed, preschoolers' solitary play with objects becomes more sophisticated as a result of their increased symbolic understanding. Gradually, children's symbolic representations in play begin to involve other people, particularly peers, as they recruit them to engage in joint symbolic interactions. The development of pretense in play also emerges. Some children begin to engage in fantasy play with imaginary peers, puppets, and stuffed animals by themselves. By the culmination of the preschool years, most children participate in sociodramatic play, the most sophisticated form of play, which involves recruiting other individuals to act out related roles. For instance, one child plays the role of the teacher while the other enacts the role of a student. The capacity to engage in symbolic and pretend play is beneficial to preschoolers' cognitive advancements. For instance, early instances of pretense, particularly those pretend-play acts constructed in conjunction with parents and peers, is shown to advance the social-cognitive skills of children later on in the preschool years, such as theory of mind.

In addition to its cognitive characterizations, preschoolers' play is often characterized according to the degree to which it involves the social participation of others. Thus, children's participation in play activities can range from merely watching others, to *solitary*, *independent play*, to *parallel play*, to *cooperative play* in which all members' participation in the activity is fully coordinated. Typically, preschool children between 3 and 5 years of age engage in parallel play, which involves two or more children in close physical approximation to each other engaging in related activities. However, the actions of these children are not coordinated or cooperative in any way.

Effects of Day Care

During the past several decades, numerous studies examining the impact of daycare on preschoolers' social and cognitive abilities have revealed a range of both positive and negative outcomes. Historically, earlier studies examining the influence of day care experiences found that maternal employment was related to less secure parent-child attachment styles. However, these earlier studies were wrought with problems, such as low numbers of participants and inadequate controls, and most important, researchers' ability to replicate the earlier findings varied. To disentangle the exact effects of early day care and maternal employment on children's developmental outcomes, a host of researchers came together, funded by the National Institute of Child Health and Human Development (NICHD), to help resolve the debate over maternal employment and day care.

Since 1991, NICHD researchers from across the United States have established testing sites to assess these issues longitudinally in economically and culturally diverse families. The general patterns of findings reveal that the quality of day care and amount of time spent in day care are most predictive of the types of interactions children share with their caregivers, particularly their mothers. Thus, children who attend

low-quality day care centers or spend a lot of time in day care are most likely to develop insecure attachments with their caregivers.

The pattern also holds true for developmental outcomes, such as cognitive and linguistic skills, in that the higher the quality of care, the more likely the child is to experience positive outcomes. In relation to negative outcomes, the effects of early, full-time day care were particularly exacerbated for 3-year-old boys of less sensitive mothers. Specifically, these children scored lower on tests assessing school readiness. In addition, children spending more time in day care have higher rates of behavioral problems during the latter preschool and kindergarten years, regardless of the quality of care these children received. Thus, higher quality of care does not always yield positive benefits.

SUMMARY

During the preschool period, children make enormous strides across cognitive, social, and physical domains. In each of these areas, children show both strengths and limitations. These developments in these domains are interdependent, so that changes in one domain affect changes in the others. For example, the development of better language skills changes the nature of children's social interactions with their parents and peers. All of these developments lay the foundation for the next period of development—middle childhood.

—M. Jeffrey Farrar and Joann P. Benigno

See also Baumrind, Diana; Bronfenbrenner, Urie; Piaget, Jean

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PRETERM INFANTS

In comparison with infants born at 40 weeks, the expected length of pregnancy, infants born before they have reached 37 weeks' gestation are considered premature. About one of eight infants, or 12%, is born premature in the United States, resulting in more than 485,000 preterm births. Of these premature infants, about 60,000, or 1.4%, are born at 32 weeks' gestation or earlier. All babies born before their expected due dates are at higher risk for complications that can affect the growing baby and family well into childhood. The earlier the infant is born, the more likely there will be significant medical complications and less optimal developmental outcomes.

The highest rates of premature births are in women younger than 20 and older than 35 years and in African American mothers when compared with mothers of other ethnic backgrounds. Although the cause of prematurity is not known, a variety of contributors to poor pregnancy outcomes have been identified, including poor nutrition during pregnancy, smoking, substance abuse, infections, and multiple-birth pregnancies. The substantial increase in rates of prematurity during the past decade is in part a result of an increase in the number of women who are postponing pregnancy and in part to an increased use of assisted reproductive technologies. These therapies often result in multiple fetuses, which tend to be born prematurely.

Technological and pharmacological advances in reproductive medicine now make it possible for older women to conceive and for couples who were thought to be infertile to become pregnant and have babies. Many assisted pregnancies result in twins, triplets, or higher-order multiples. Any increase in the number of fetuses sharing a uterus also increases the rate of premature birth, which has resulted in an increasing rate of premature, multiple-birth admissions. From 1980 to 1997, pregnancies resulting in multiple births increased by 52% overall, and triplets and higher-order births increased by 404%. Only recently have the rates declined, although twin rates continue to climb. Rates of prematurity and death for twins and higher-order multiples are 4 to 33 times higher than those for single-born babies.

Preterm birth is the number one obstetric challenge and a leading problem for ongoing pediatric care. It is the leading cause of neonatal death in the first month of life in the United States and the second leading cause of death for infants as a whole. Additionally, preterm birth contributes substantially to neonatal and infant illness. Not only does preterm birth have serious health consequences, but it also contributes to significant national health care costs. Intensive care for premature infants is a fairly recent phenomenon.

Technological, pharmacological, and specialty hospital care for infants born early began only in the 1960s. Because infants born prematurely are unable to survive without significant intensive medical support, they are typically cared for in specialty intensive care units, which have been regionalized according to medical acuity. Infants born earliest and with the most severe complications are provided care in intensive care units that have specific expertise and can respond to life-threatening events. Similarly, infants who are born closer to term and do not have life-threatening conditions might be hospitalized in an intensive care unit that has fewer technical and medical intervention requirements.

As a result of increases in medical technology and expertise, smaller and earlier-born infants not only survive, but thrive. High-tech neonatal intensive care units (NICUs) now provide medical, developmental, environmental, and family support for the growing infant. Thanks to these improvements in medical and technological intervention, infants born at 23 to 26 weeks' gestation (typically weighing 500–850 grams) now have a 40% to 60% chance of survival. Babies born at 27 to 28 weeks' gestation (about 750–1000 grams) have about an 85% chance of survival. As the pregnancy goes on, survival rates increase dramatically, so that almost all infants born at 34 weeks' gestation or later survive. However, survival alone does not ensure that the baby will have good health or typical development. Although many infants born prematurely have typical development and do not face long-term medical or developmental complications, about 10% of infants face significant risk for severe neurodevelopmental problems, including major, permanent neurosensory impairments such as blindness and deafness; cognitive and language delays such as mental retardation; motor deficits such as cerebral palsy; and learning disabilities. Children who were born prematurely may experience subtle but substantial neurodevelopmental and socioemotional deficits, including mild cognitive delays, speech and language disorders, persistent neuromotor problems, and perceptual problems. These difficulties may not be identified until school age, when prematurely born children must use more differentiated language, visual-spatial skills, and social competencies to succeed. In the classroom environment, their developmental and behavioral challenges become increasingly apparent. Typically, they do not subside as prematurely born children grow; rather, these difficulties may persist into adolescence and even young adulthood, although many have adapted well and report a good quality of life. Many of these underlying deficits lead to significant challenges in school for children who began their lives in the NICU.

Prematurity and the NICU experience have long-term effects on parents and siblings, as well as on the growing child. The impact of these early stressful experiences influences family relationships and family functioning and may result in a variety of less than optimal social, economic, and developmental outcomes. Families in crisis because of the premature birth or from ongoing medical, social, or economic distress have a hard time relating to their babies, making relationships between infants and their parents difficult. Effects of early experiences on family functioning and interactions may be reflected long into the child's early years and into adolescence.

Premature infants have difficulty in communicating clearly through their behavior, in comparison with infants born at full term. Consequently, parents have difficulty in understanding and responding appropriately to their newborn's needs and requests. Not surprisingly, relationships between preterm infants and their parents are often difficult. Because infant development occurs in the context of relationships, the preterm infant, whose communication is not well defined, is at significant risk for relationship disruption and subsequent developmental delay. Prematurely born children are at higher risk for abuse and neglect, reflecting early relationship difficulties.

Intervention strategies for modifying the NICU environment and caregiving practices have recently been proposed to address the growing scientific evidence that the environment in which the vulnerable infant grows can have a significant impact on brain development and function. Modifications in sound and light exposure in the NICU that are now implemented address the realization that infant neurological development is exquisitely sensitive to the timing, modulation,

and integration of sensory input presented at sensitive periods of development. Similarly, caregiving practices are now modified to reduce painful stimulation, to support the infant's emerging behavioral organization, and to engage the family in care of the infant. Scientists and medical professionals are just beginning to understand how environmental sensory input and caregiving affect the developing premature infant. Available evidence suggests that the best environment for the stable premature infant is his or her parents' faces, voices, and bodies. They are familiar, appropriately complex, multimodal, and specific to the infant's individual expectations and needs, and can readily modify themselves according to the baby's responses. Emphasis is also being focused on prevention and amelioration of painful procedures in the NICU because research suggests that repeated painful interventions in the NICU may have long-term adverse behavioral and physiological effects.

Because prematurely born infants are at higher risk for neurodevelopmental and sensory deficits that may be evident at birth or that may not emerge until the child is older, support for transition from the hospital to the home community is essential. Close follow-up with sequential evaluation of developmental progress is imperative to ensure appropriate development and engagement of the family with the infant, or to provide intervention should the child be found to have developmental delays. Interdisciplinary teams that have experience and specialize in the assessment and treatment of neurodevelopmental sequelae of early birth should be provided to the family in their community. Should the infant have, or develop, significant medical or developmental conditions, they should be referred to appropriate intervention services.

The complexities of premature birth continue to be challenging for health care providers, families, and educational systems. The vulnerability of these babies and their families lasts far beyond the newborn intensive care unit and extends far after discharge. Premature birth can affect the child's cognitive and socioemotional development well into the school years. Therefore, advances in medical care, modifications of early environments and caregiving, and supportive parental relationships must begin early and continue into the child's early years so that they can experience the best developmental outcomes possible.

—Joy V. Browne

See also Neonate

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PREVENTIVE MEDICINE

Preventive medicine is the practice of disease prevention and health promotion. Practitioners of preventive medicine, who may be health care professionals, psychologists, or policy makers, have a knowledge base in clinical medicine, public health, and behavioral medicine. Prevention programs seek to stop the occurrence of a negative outcome before adverse events take place through early identification of problems and early intervention to diminish negative effects. For example, tobacco use has been associated with an increased risk for negative health outcomes, such as heart disease and cancer. Thus, tobacco use reduction programs provide a good example of a current area of focus in preventive medicine and will be used to illustrate the basic concepts of prevention.

Prevention can be implemented at any of three stages of the development of a health problem: primary, secondary, or tertiary. Primary prevention is

applied before problems are evident; for example, teaching school-age children not to begin smoking. Secondary prevention interventions might be used when problems are considered likely or when health screenings have shown the problem to be in its early stages so that further development does not occur. For example, secondary prevention programs would be used to help someone who reports being a smoker quit smoking, even though the individual does not have any negative health effects. Tertiary prevention occurs when problems have already developed, and prevention is used to reduce impairment and avoid development of further problems. With tobacco use, tertiary prevention would be used with smokers who require medical attention for a mild respiratory problem that is likely linked to their smoking habit.

Prevention programs may be implemented at a structural level or a behavioral level. Structural prevention involves modifications to the environment, which can range from changing building and city design to passing laws or adding warning labels. In the case of reducing tobacco use, building designs that relegate smokers to small unattractive spaces and laws prohibiting smoking in many public buildings are examples of seeking to decrease smoking rates through structural prevention. Behavioral prevention involves direct modification in human behavior, which would include any of the programs designed to help individuals stop smoking, such as the nicotine patch or smoking cessation classes run through health clinics. In the field of injury and accident prevention, prevention is often discussed as being either passive or active. Passive prevention requires minimal effort by an individual by creating changes to the environment such as governmental standards requiring installation of airbags and building firewalls in apartment complexes. Active prevention requires frequent action by an individual. For example, this may include buckling up during every car trip or installing locks on kitchen cabinets, both of which require correct use every time to gain protective benefit.

Research on the effectiveness of preventive medicine techniques reveals mixed results. Increased knowledge through large-scale community campaigns is sometimes linked to behavioral change. A good example may be the public health campaign for pregnant women to have an adequate intake of folic acid. Also, physician counseling has been shown to increase healthy behaviors, but long-term effects are limited, and overall effects are small. Passive prevention, such as water fluorination and regulation of car seat manufacturing, can be a very effective means of health promotion and injury prevention.

SPECIALIZATIONS

Preventive medicine has been a board certified medical specialty since 1948. Training is primarily through a postmedical school residency program that includes a master's degree in public health and clinical and practicum training in preventive medicine. The core knowledge areas for this training are health services administration, biostatistics, epidemiology, clinical preventive medicine, behavioral aspects of health, and environmental health. This training prepares specialists for jobs in public policy, administration, research, or primary care. A preventive medical specialist in a primary care setting seeks to increase long-term health outcomes through frequent screening for possibly emerging health problems, medical techniques (i.e., medicine and surgery), and behavioral counseling. For example, a patient with high cholesterol (which has been linked to an increased risk for cardiovascular disease) may receive a medication known to reduce cholesterol levels, have blood tests every 6 months to monitor cholesterol levels, and be counseled about dietary and exercise changes to further reduce the possible negative health effects of high cholesterol.

Some medical specialties, such as pediatrics and family medicine, have long adopted prevention and promotion activities with emphasis on immunization, injury prevention, nutrition, and healthy development. Gerontology, the comprehensive study of aging and the problems of the aged, is a related and emerging medical field that has a strong focus on maintaining and improving a high quality of life for older adults. Because quality of life (i.e., minimizing the disabilities and handicaps of old age) is a goal of preventive medicine, gerontology has generally become more effective in integrating preventive medicine with primary medical care. Because a preventive medicine approach encompasses many areas of medicine, gerontology (and preventive medicine in general) recognizes the interaction between mind and body and that easing psychological stress aids physical health. Thus, gerontologists take a holistic approach that is interested in preventing the potentially negative psychosocial effects of aging. For example, a gerontologist may monitor a patient's feelings of loss when no

longer able to perform a specific leisure activity (e.g., jogging) and may help the patient identify alternatives (e.g., swimming laps).

HISTORY AND FUTURE

Two historical changes have led to the emergence of the specialty of preventive medicine. First, because cures are available for most infectious diseases, and advances in public health (such as better sanitation systems) have led to longer life spans, medical science has begun to focus on preventable health problems and better management of chronic diseases. Second, the health cost benefits of the prevention and early detection of disease has been recognized. For example, effective management of diabetes not only enhances a person's current quality of life but also helps prevent the development of costly and debilitating conditions such as blindness and kidney failure.

As the field of preventive medicine grows, the list of recommended prevention activities also grows, such that the U.S. Preventive Services Task Force guidelines for an average adult patient suggest a health care provider perform 25 preventive activities and address 15 risk factors. However, many barriers exist for the implementation of many preventive medicine techniques in primary medical settings (i.e., doctor's offices or health clinics). For example, the structure of many health insurance plans will often reimburse doctors for treatment of an already present health condition but not for the prevention of a problem that may occur several years down the road. Consequently, although most health care providers recognize the need for preventive medicine and practice it to a limited degree, they are unable to effectively implement all suggested activities (especially with financial incentives that limit the amount of time spent with each patient).

Overall, preventive medicine is a diverse, dynamic, and growing field. As mentioned previously, decreasing tobacco use and increasing the quality of life for older adults are two current areas of focus for the field. Other areas of interest are the prevention of cardiovascular diseases through changes in diet and exercise, the reduction in the spread of infection diseases such as human immunodeficiency virus (HIV) and hepatitis B through the development and distribution of immunizations, and the public health campaigns to increase screenings for early detection of skin, breast, and colon cancers. The U.S. federal health care initiative *Healthy People 2010* provides an agenda for comprehensive, nationwide health promotion and disease prevention. The health outcome objectives established by *Healthy People 2010* seek to eliminate health disparities, increase quality of life and years of life, and increase awareness and funding for preventive medicine research and interventions.

Important future directions for the field of preventive medicine include continuing to identify what makes people more likely to respond to recommendations to promote healthy behaviors. Current research indicates that perception of disease risk, attitudes about treatment, and motivational readiness are related to the likelihood of behavior change, and future research will likely focus on how best to prepare people (on a community and individual level) for change. Increasing the maintenance of health behavior change through the development of sustainable health interventions and effective follow-up techniques will also continue to be a focus for the field.

Emerging technologies, such as Internet-based information, new genetic research and treatments, new immunizations, and use of computer programs to influence change, will also likely affect the field of preventive medicine. Research to develop these technologies in a way to optimally affect health behaviors will be an important focus for preventive medicine. Finally, preventive medicine will likely continue to be active in creating system-wide health promotion changes through legislation and community public health movements.

—Montserrat C. Mitchell and Michael C. Roberts

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PRIMARY CIRCULAR REACTIONS

Circular reaction is term coined by Jean Piaget (1896–1980), a developmental biologist by training, who devoted his life to studying intellectual abilities from infancy to adolescence. The term describes stages of the infant's cognitive development in the sensorimotor period, the first of the stages identified by Piaget, which lasts from 0 to 24 months of age. During this period, infants discover relationships between actions of their bodies, such as moving the fingers of their hand in order to open their hands or in order to make a fist, and relationships between their bodies and the environment, such as kicking a mobile and making it move, or vocalizing and making the mother appear.

The sensorimotor period is divided into several stages, namely reflexes; primary, secondary, and tertiary circular reactions; and invention of new means through mental combination. The first of these stages is the reflexive stage, from 0 to 2 months, when infants are able to perform simple reflexes such as grasping and sucking, and from these reflexes circular reactions develop. The second stage, according to Piaget's theory, is the stage of primary circular reactions, typically lasting from 1 to 4 months of age. Through exploration of their world, infants at this stage discover associations between events. They orient themselves toward the external world and might show their first social smiles. According to Spitz, the first true emotions occur at this time because reactions at this stage reflect a relation between infants and their observations of familiar objects, such as faces. In cognitive terms, infants learn that specific behaviors lead to specific events. At the stage of primary circular reactions, infants open and close their hands and observe these results. For example, 3-month-olds with the arm extended watch their fingers move; then lowering the arm, they find themselves with their fingers near their mouths and finally manage to insert their fingers into their mouths. Infants have been observed to suck their thumbs even in the womb, but we assume that once they experience this sensation in the sensorimotor period, they gain pleasure from it and hence repeat the event. At the stage of primary circular reactions, infants have a rudimentary ability to anticipate events, but they are not yet able to discern effects they might have on the external world.

The repetition and reorganization of the infant's schema leads to the third stage, that of secondary circular reactions, lasting from 4 to 8 months, in which an infant will, for example, kick a mobile and observe the mobile move, then reproduce the behavior in order to reproduce the event. Through coordination of its activity, the infant learns to produce a result to control physical and social events and thereby learns personal agency. This is in contrast to the stage of primary circular reactions, in which infants learn self-awareness, in the sense of experiencing self (my fingers move) in relation to self (I control the movement of my fingers) but are not yet aware that they are in control of interpersonal events. At the stage of primary circular reactions, infants cry and mother appears, but infants at that stage do not plan to make the mother appear by crying as they can at the stage of secondary circular reactions. From 8 to 12 months, according to Piaget, infants apply what they learned during the stages of primary and secondary circular reactions to new situations. At the time of tertiary circular reactions (12–18 months), infants actively experiment to provoke new effects, such as pouring their cereal from the bowl onto the high chair. Tertiary circular reactions develop at 18 to 24 months into invention of new means through mental combination. At this stage, infants speak their first words and are capable of pretend play.

—Nadja Reissland

See also Piaget, Jean

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PRIVATE SPEECH

Private speech is the term used by psychologists and scientists to refer to speech that is not addressed to another person and instead is directed at the self. Private speech, or self-talk, refers only to one's overt, audible speech and one's visible, quiet, verbal lip movements, not the unobservable speech that goes on "inside one's head" when one is thinking to oneself in words—typically referred to as *inner speech*. Although

children and adults of all ages engage in overt self-talk at times, most of the research focus on private speech has been on children during the preschool years, the period during which private speech is most frequently observed. An example of children's private speech would be a child who, while working alone building a robot out of Legos in his room, says things like "I need two more blues. Where did I see those big blue pieces? Oh. Here they are."

Private speech was first observed scientifically in children in the early 1900s by both Lev Vygotsky (1896–1934), a Russian developmental psychologist, and Jean Piaget (1896–1980), the well-known Swiss scientist and theoretician, who, at the time, referred to such speech as *egocentric speech*, a term no longer used because of its undesired negative connotations. Vygotsky and Piaget differed in their interpretations of children' private speech. For Piaget, private speech was thought of as poor social speech and simply indicative of young children's immature cognitive and language development that made it difficult for them to engage in competent, social, communicative speech with other people. Thus, for Piaget, the developmental movement was one from the internal world of the child to the external social world—children's private speech would eventually disappear with age as their social speech improved.

For Vygotsky, however, private speech was seen as evidence that an important internalization process, from the external social world to the internal cognitive world of the child, was going on. Children first use language for communication with others socially, and then language begins to be used by children not only for communication (social speech) but also as a tool for thought and behavioral regulation (private speech). At first, children's behavior, and much of their cognitive activity as well, is regulated or controlled by others, first physically and later verbally through the language that adults use with children. Then children begin to talk out loud to themselves and use private speech to guide thinking, problem solving, and behavior. Finally, typically in the late preschool and early school years, children's overt private speech is replaced with inner speech, or inner, verbal thought. Today, it is this Vygotskian interpretation of the role of children's private speech that is widely accepted.

Researchers have learned a variety of things about children's use of private speech by observing children's use of self-talk in naturalistic settings and by analyzing videotapes of children of different ages working on problem-solving tasks in structured laboratory settings. First, self-talk is normal, natural, and healthy for children (and adults), and such speech is indeed helpful. Interestingly, young children themselves appear to know this because they report positive effects about their own use of self-talk. Second, people tend to use private speech when they need the extra help to get a task done, either because the task is particularly challenging or because they are cognitively, emotionally, or motivationally spent. Thus, a common pattern is to see increased private speech use in children when the task activity they are engaging in gets more difficult, as if the private speech becomes an extra tool they use to overcome obstacles. Also, children's use of private speech can be influenced by others around them. Children who are exposed to rich language environments at home and at school and are cognitively stimulated and advanced compared with their peers appear to use private speech earlier and internalize their speech earlier (have it replaced with whispers and inner speech) than children from different environments.

The implications for teachers and parents of the research on private speech are relatively clear. Researchers typically recommend that teachers allow, if not encourage, children to use private speech in the classroom, as long as it is not too loud and disruptive to other children, because it is a natural and effective learning tool for youngsters and because quieting down children who find it useful to spontaneously talk out loud to themselves during their work typically hurts their performance. Teachers and parents can also learn a lot about what children are thinking and feeling and about what strategies they are using to solve academic problems by listening carefully to children's private speech. In that sense, children's private speech can be used as an assessment tool by teachers for learning what is going on in the child's head. Also, parents can increase children's use of private speech by working together with their children on appropriately challenging problem-solving tasks, by encouraging the child to speak while the two work together on the task, and by allowing the child the autonomy to do as much of the task as possible by himself or herself.

Children with problems of behavioral self-control, such as those with behavior problems and those diagnosed with attention deficit hyperactivity disorder (ADHD), also use private speech as a tool for self-regulation; however, such children appear to be delayed in their internalization of such speech. That is, they continue to use overt self-talk while other nonproblem

children of the same age talk less to themselves or have moved on to quieter, partially internalized forms of speech (whispers or inaudible mutterings) or silent inner speech. There are a variety of intervention programs for such children that attempt to make their private speech more effective in guiding behavior.

Children's private speech appears to internalize (go away and become inner verbal thought) by itself over time as part of a natural process after the child has had sufficient experience successfully talking himself or herself through problems. Thus, although counterintuitive for parents and teachers, who may want children to stop talking to themselves, the way to eventually get them to be quieter and to think to themselves inside their head is actually to foster and encourage children's use of overt self-talk. After sufficient experience doing so, the speech will go underground by itself. Telling children to stop talking does not work and tends to disrupt their performance.

Although this discussion has mostly centered on children's self-talk with behavioral and cognitive self-regulatory functions while youngsters are engaged in various cognitive problem-solving activities, there are other types of private speech that may serve different functions. Some toddlers, for example, talk to themselves at length in their cribs either before going to sleep or after waking. This type of private speech, called *crib speech*, appears to serve several important functions for children as well, such as practice in pronunciation of new words and utterances that the child is currently in the process of mastering and consolidation of memories and processing of emotions from the day's events. Also considered private speech, but of a different type, are all of the utterances young children make (i.e., noises, sound effects, and dialogue) during their solitary fantasy pretend play, with dolls and figurines, for example. These forms of self-talk, however, have not been studied in as much detail.

—Adam Winsler

See also Language Development; Scaffolding; Vygotsky, Lev

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PROBLEM SOLVING

Problem solving occurs when actions are taken to progress from a present situation to a more desired, goal situation, while overcoming any barriers to the goal. The seven stages of problem solving are presented sequentially here; however, the stages compose a flexible problem-solving cycle, and individuals may skip over, repeat, or rearrange stages of the cycle and still problem-solve effectively.

The initial problem-solving stage is problem recognition or identification. This stage includes identifying a goal, goal-path obstacles, and solution errors. Problems can be classified as presented, which are most easily identifiable; as discovered; or as created, which are the most difficult to identify.

The second stage is defining and mentally representing the problem. This stage requires a clear statement of the problem scope and goals. Also, information regarding the current state, goal state, relevant operators, and any restrictions must be cognitively organized for efficient retrieval and application.

The third stage involves forming a strategy for solving the problem. Strategies may entail breaking down the problem into elements (analysis) or rearranging and combining elements (synthesis). It is helpful to brainstorm a variety of possible strategies (divergent thinking) and then to decide on one promising strategy (convergent thinking).

Fourth, the problem solver must gather and reorganize new and old problem-related information. In contrast to the second stage, this fourth stage requires collecting and organizing information in a way that will best support implementation of the specific strategy that was identified in the third stage.

Individuals allocate various resources for problem solving in the fifth stage. Such resources include time,

effort, attention, assistance, money, and materials. Mental resources are more effectively spent on initial, global planning rather than on details and strategy implementation.

In the sixth stage, problem solvers monitor their progress toward their goal. Such reflection must occur along the route toward a solution rather than only after the strategy has been entirely implemented so that modifications can be made before resources are spent unnecessarily.

Finally, individuals evaluate the results of their problem solving in terms of their goal state once they are finished. Evaluation immediately following completion, after a delay, or after a great deal of time can confirm or invalidate strategy effectiveness. Additionally, such reflection can provide new insights regarding the situation and all aspects of the problem-solving cycle.

Each problem-solving stage is affected by the definition and structure of a problem. Well-defined problems have easily identifiable solution paths, often involving algorithms or heuristics, but those paths may still be difficult to follow. An ill-defined problem, in contrast, may require insight to identify, define, represent, and formulate a strategy for the problem.

Problem solving can also be affected by development. As proposed by Jean Piaget and later supported empirically, problem solving (strategic behavior and means–end action sequencing) is possible at 8 months of age. With development and knowledge gain, goal-directed behavior on complicated tasks increase, and by 24 to 36 months, children can monitor their performance, make corrections, complete tasks successfully more often, and respond emotionally to success or failure.

Additionally, development affects strategy use, but not in discrete stages as was previously thought. According to the adaptive strategy choice model developed by Robert Siegler, individuals use a variety of strategies on a single problem—sometimes more than one at a time. Strategies are selected depending on the nature of the task, the goals of the individual, and the past effectiveness of a strategy. Additionally, the frequency of use of a single strategy changes over time. Initially, an individual prefers simple strategies, but with practice and maturation, individuals prefer more efficient strategies even if the more efficient strategies require more effort.

—Anne S. Beauchamp

See also Cognitive Development, Learning

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PROSOCIAL BEHAVIOR

Prosocial behaviors are actions children engage in for the good of another person and with no expectation of personal reward. Examples of prosocial behavior include sharing, helping, cooperation, and altruism. The emergence of prosocial behavior depends on cognitive and emotional developments in early childhood, and therefore, truly prosocial behaviors are not observable until the toddler years. Cognitively, children must have an appreciation of others' perspectives or an understanding that other people can think and feel differently than themselves. Emotionally, children must learn to recognize others' emotions and experience complex emotions related to others, including sympathy and empathy. With these cognitive and emotional skills in place, children acquire prosocial behaviors most readily through modeling the behaviors of influential people in their lives, such as siblings, peers, and parents. Over time, prosocial motivations are gradually internalized, so that by the preschool years, children react prosocially in the absence of parents or teachers. Factors influencing the typical development of prosocial behavior and factors that relate to individual differences in the likelihood of displaying prosocial behaviors, including gender, temperament, and developmental disorders, particularly autism, are discussed in more detail below.

COGNITIVE DEVELOPMENT AND PERSPECTIVE TAKING

One precursor to the development of prosocial behavior is perspective taking, the ability to imagine what another person is thinking or feeling. One way that infants learn about another's perspective is through joint attention. Infants initiate joint attention by pointing at an object or looking at their caregiver in order to share an

experience, and also respond to their caregiver's initiation of joint attention by looking at and interpreting the caregiver's facial expressions to learn about what he or she is feeling. Infants use these experiences to gain perspective on others' thoughts and feelings. When measured at 12 months of age, an infant's ability to initiate the sharing of experience predicts the development of prosocial behaviors, such as compliance, empathy, and prosocial peer interactions at 30 months of age. Hence, it appears that the groundwork for prosocial behavior begins to be laid in infancy when coordination and sharing of attention with others allows infants to learn about the differences between theirs and others' perspectives. By early childhood, children who are better able to understand others' psychological states are more popular with their peers. Perspective taking plays such a central role in the development of prosocial behavior that attempts to increase perspective taking are often the primary focus in the treatment of antisocial behavior in children and adolescents. Interventions that serve to foster perspective taking through coaching and practice have been shown to increase empathy and prosocial responding in at-risk children.

EMOTIONAL DEVELOPMENT AND EMPATHY AND SYMPATHY

Once children are able to take the perspective of others, they begin to experience complex emotions, including empathy and sympathy. *Sympathy* describes feelings of concern or sorrow for another person. For example, a young child feels sympathy for a friend who is crying because she lost her dog. *Empathy* goes beyond just feeling concern for another to include engaging or feeling with another person and responding in an emotionally similar way. For example, a young child feels empathic when she becomes tearful upon seeing her mother crying over the death of a friend. Often, empathy and sympathy serve as primary motivators for prosocial behavior. That is, when they experience empathy or sympathy, children are motivated to speak or act in a way that will help relieve the other person.

LEARNING THROUGH OBSERVATION

According to social learning theory, prosocial behaviors are most readily learned through exposure to appropriate models. Several studies based in the social learning tradition have demonstrated that young children observe and then imitate the prosocial behaviors of influential people in their environments. For example, children who watched an adult play a bowling game and then choose to donate the winnings to a children's charity fund were much more likely to donate their own winnings when playing the same game than were children who had not previously watched the adult do likewise. That is, children modeled the generosity and sharing behavior of the adult when making decisions about their own behaviors. The extent to which models are effective in eliciting prosocial behaviors depends on characteristics of the children watching as well as the models themselves. Specifically, preschool-age children are particularly influenced by models. In addition, the most influential models are those adults who are (1) warm and responsive in their interactions with children, (2) viewed as competent and powerful, and (3) consistent in what they say a child should do and what they do themselves.

FACTORS INFLUENCING INDIVIDUAL DIFFERENCES IN THE EXPRESSION OF PROSOCIAL BEHAVIOR

Temperament

Temperament describes individual differences in children's emotional reactions and their ability to manage or regulate these reactions (Rothbart & Bates, 1998). For many children, feelings of empathy for others provide the impetus for sharing, helping, or other behaviors that function to aid another person. But for other children, watching others experience some kind of distress makes them feel so empathic that they are overwhelmed by their own emotions to a point that they are unable to help others. Eisenberg and colleagues have suggested that a child's temperament will determine whether the child is able to translate feelings of empathy into prosocial actions. Specifically, sociable, assertive children who are good at regulating their emotions are more likely to respond prosocially to others' needs, whereas children who have difficulty regulating their emotions experience personal distress and therefore are unable to help when exposed to another's negative emotion.

Gender

Across all stages of development, girls are more likely than boys to display prosocial behavior,

particularly expressions of kindness and consideration. This may be due in part to girls' greater susceptibility to experiencing feelings of empathy and sympathy, which in turn predicts more prosocial acts. In addition to seeing gender differences in the frequency of prosocial behavior, there are also differences in the types of prosocial behaviors in which girls and boys engage. Specifically, by middle childhood, girls express prosocial behavior through expressions of sympathy, feelings of responsibility for their own actions and the welfare of others, and psychological perspective taking. In contrast, boys display prosocial behaviors through instrumental acts of helping. As is the case with gender differences in many aspects of social behavior, it remains unknown whether these robust differences are a product of biology and inherited differences or a function of gender differences in societal expectations and socialization experiences. It is most likely a combination of both.

Maladaptive Parenting

Given the salience and importance of modeling in the acquisition of prosocial behavior, it is not surprising that unhealthy or maladaptive parenting practices are associated with deficits in children's prosocial responding. For example, preschoolers who have been physically abused are more likely to respond to others' unhappiness with fear, anger, or physical attacks rather than prosocial acts. This is likely because this is how they have observed their own parents respond and because these children have had inadequate opportunities to learn how to regulate their own emotions in adaptive ways.

Developmental Disorders—Autism

Children with autism display clear deficits in prosocial behavior that are evident beginning in infancy when they are largely unaware of other people's points of view. Although typically developing infants between 12 and 18 months look to their caregiver's face in order to share information about how they are feeling about an object or event, children with autism do not. Because of this tendency, autistic children have far fewer experiences from which to learn about the feelings and emotions of others. As such, young children with autism show deficits in behaviors that require an understanding of others, such as perspective taking, emotion recognition and comprehension, and empathic responding, behaviors that are all necessary for appropriate prosocial behavior. One of the hallmark characteristics of young autistic children is a lack of responsiveness to the needs of those around them. For example, a typically developing toddler, having learned to recognize emotions and having witnessed reactions to such emotions, will offer comfort to his or her caregivers if they are hurt or ill. A child with autism, however, will not show the same awareness of another's feelings and will not offer appropriate comfort. Interestingly, among autistic children, there are gender differences in prosocial behaviors, such that girls with autism are more likely than boys to display prosocial behavior in situations of distress. This suggests that, as with typically developing children, there are a wide range of prosocial abilities within the autistic population.

—Heather A. Henderson and Caley B. Schwartz

See also Social Development

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PROSTATE CANCER

Prostate cancer is a malignant tumor that forms in the tissue of the prostate gland, a walnut-shaped gland that produces the semen that transports sperm and is necessary for male reproduction. The prostate gland is located between the bladder and the penis, and the urethra travels through the prostate.

INCIDENCE AND OCCURRENCE

Prostate cancer is the most often diagnosed form of cancer in men in the United States other than skin cancer, with 220,900 new cases of prostate cancer diagnosed in 2003 and 28,900 deaths from this type of cancer occurring annually, only second to lung cancer as a cause for cancer-related deaths in men. Some of the facts about prostate cancer from the Centers on Disease Control and Prevention are as follows:

- About 70% of all diagnosed prostate cancers are found in men aged 65 years or older.
- During the past 20 years, the survival rate for prostate cancer has increased from 67% to 97%.
- The prostate cancer death rate is higher for African American men than for any other racial or ethnic group.
- Compared with other racial and ethnic groups, the Asian/Pacific Islander group has relatively low rates of prostate cancer incidence and mortality.
- Among all racial and ethnic groups, prostate cancer death rates were lower in 1999 than they were in 1990.
- Decreases in prostate cancer death rates during 1990 to 1999 were almost twice as great for whites and Asian/Pacific Islanders as for African Americans, American Indian/Alaska Natives, and Hispanics.

DIAGNOSIS

Prostate cancer can be diagnosed in a variety of ways. First, with a digital rectal examination (DRE), the physician can feel the prostate gland for any abnormalities, including texture and growths. Second, a prostate-specific antigen (PSA) blood test can reveal the presence of a cancer-related antigen in the blood, often an indication of abnormality. This test is recommended for all men older than 50 years, and unusually high or consistent levels of this antigen (above 4) can be a cause for concern, as can a rapid increase in this value from test to test. Although there is good evidence that PSA screening can detect early cancers,

it is unclear whether such detection through the PSA test results in better health outcomes. If there is reason to believe that the patient may have prostate cancer, a needle biopsy can be performed, in which very small bits of tissue are taken from both sides of the prostate with a special device that is inserted through the rectum and guided using sonography. Although this is an uncomfortable procedure, it can be done in the doctor's office on an outpatient basis.

TREATMENT

Currently, most men can be cured of prostate cancer if the cancer is detected in its earliest clinical stages. The gold standard for treatment of localized disease (which means the cancer has not spread beyond the prostate gland) is the radical prostatectomy, in which the prostate gland is removed through surgery. This is a major surgical procedure that can involve a somewhat lengthy period of recovery. Possible complications include impotence and incontinence, which vary in their degrees of severity, although various therapies and drugs can successfully treat these side effects in more than 90% of the men who are affected. Other treatments for localized prostate cancer include internal and external radiation and freezing of the cancerous cells, all of which can have side effects as well. Because so many men develop prostate cancer (but do not die from it), some physicians suggest "waiting and watching" and paying close attention to PSA levels and biopsy results until more aggressive treatment is indicated.

If the cancer has spread beyond the prostate, hormonal therapy and alternative treatments ranging from acupuncture to nutritional supplements are available; these are all undergoing clinical trials.

—Neil J. Salkind

See also Cancer

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PSYCHOANALYTIC THEORY

Psychoanalytic theorists have emphasized various aspects of development across the human life span since Freud's introduction of the genetic principle—the persistence of the past into the present—over a century ago. Although psychoanalytic developmental theory now encompasses a number of different and sometimes mutually incompatible frameworks, this entry, owing to limitations of space, will briefly review three of the most influential among them. These are Freud's theory of libidinal development, Mahler's separation-individuation theory, and Kohut's "selfobject" theory.

CLASSICAL PSYCHOANALYSIS: LIBIDINAL DRIVE AND THE OEDIPUS COMPLEX

In classical psychoanalysis, the body of thought intimately associated with the theories of Sigmund Freud, human sexuality is understood to have its origins in early childhood. This idea, once considered controversial, asserts that continuity exists between the sexual wishes of childhood and the sexual behavior of adults, and furthermore, that adult sexuality cannot be fully understood without an appreciation of its roots in childhood sexual desires. Sexual desire in childhood, however, is qualitatively distinctive from that in adulthood and is composed of various sensual pleasures experienced in association with sensitive parts of the body, such as the skin, the mouth, the anus, and the genitals. Freud believed that these bodily organs, which he termed the *erogenous zones*, were *cathected* or charged with *libido* or sexual drive energy according to a specific developmental sequence.

The earliest stage of libidinal development, which Freud termed the *oral stage,* begins at birth and continues through the middle of the second year of development. Some psychoanalysts believe that there are two subphases within the oral stage, the first of which involves sucking and the second, oral-sadism (biting and devouring), but there is general recognition of the preeminence of oral needs, perceptions, and an oral mode of expression focused on the mouth, lips, tongue, and oral mucosa during this earliest developmental epoch. The next stage, termed the *anal stage* (about 1–3 years), commences with the neuromuscular maturation of the anal sphincter. Such maturation

is regarded as significant inasmuch as it furnishes the infant with appreciably greater voluntary control over the expulsion or retention of fecal products. Freud believed that there was a pleasure associated with the exercise of anal functions, which he termed *anal eroticism*. The anal stage is superseded by the *phallic stage* of development (about 3–5 or 6 years), at which time erotic pleasure becomes firmly linked for the first time to stimulation of the penis or vagina. The phallic stage is followed by a period of libidinal quiescence, referred to as *latency* (about 5–11 years), at which time there is relative inactivity of the libidinal drive, a situation that permits a fuller resolution of oedipal or triangular conflicts. The final stage of the libido is the *genital stage*, which commences with the onset of puberty and extends to young adulthood. Characterized by continuing maturation of the genital-sexual functioning, it is also associated with hormonal and other bodily changes.

Oedipus Complex

The Oedipus complex has a pivotal significance in the classical psychoanalytic literature. It is understood as a configuration of psychological forces characterized by the concentration of sexual wishes directed at one parent, usually of the opposite sex, and the concurrent emergence of hostile feelings toward the remaining parent, the child's rival in love. The Oedipus complex actually consists of both positive oedipal and negative oedipal strivings. The "positive" Oedipus complex is associated with the wish for a sexual union with the parent of the opposite sex and a coterminous wish for the same-sex parent's demise. However, because such wishes give rise both to ambivalence and vulnerability, "negative" oedipal strivings—consisting of the desire for a sexual union with the same-sex parent and feelings of rivalry with the opposite-sex parent—coexist with the positive ones. According to classical theory, the positive Oedipus complex supersedes the negative Oedipus complex, and this is considered a prerequisite for the emergence of a heterosexual orientation and cohesive identity in adulthood.

MAHLER'S SEPARATION-INDIVIDUATION THEORY

Margaret Mahler's theory of the separation-individuation process, later criticisms notwithstanding, introduced a schema that transformed not only the study of infant and early childhood development, but also that of adolescence; in addition, it has, arguably, left an indelible stamp on contemporary psychoanalytic ideas concerning character pathology. On the basis of pioneering longitudinal investigations of maternal-infant pairs in a nursery setting, Mahler portrayed a process that begins at birth and continues into the child's fourth year. Characterizing infants as essentially nonrelated or objectless at birth (the autistic phase), she described their gradual emergence through a period of maternal-infant symbiosis into four relatively discrete stages of separation and individuation: *differentiation* (5–9 months), *practicing* (9–15 months), *rapprochement* (15–24 months), and the *development of object constancy* (24–36 months and beyond).

During *differentiation*, which supersedes what Mahler had termed the *normal symbiotic phase*, infants attain a heightened level of alertness while awake and begin to explore beyond the confines of the symbiotic orbit with mother, a phenomenon Mahler also referred to as "hatching." *Practicing*, according to Mahler, actually consists of two periods, early practicing and the practicing subphase proper. Early practicing commences with the infant's newly emerging locomotor capacity to move away physically from mother, who is, nevertheless, treated as a sort of "home base" as periodic needs for "emotional refueling" interrupt the infant's exploratory activity. The practicing period proper, the specific developmental location of the infant's psychological "birth" in Mahler's view, is ushered in by the child's capacity for upright locomotion. This monumental achievement, which contributes so meaningfully to the child's sense of psychological separateness, leads to a sustained sense of exhilaration, newfound pleasure in the child's own body, and a radical alteration in the object relationship with the mother, whose importance is at times almost overshadowed by the child's excitement at being able to escape from the earlier maternal-child symbiosis. However, the emerging experience of physical separateness and psychological individuation also reinforces children's awareness of their small stature, physical dependence on caretakers, and sense of vulnerability. Mother's separateness, it seems, also carries with it the inevitability that she may not always be available at times of need, a dawning recognition that leads to the phase of *rapprochement*. As such experiences accrue, they lead to moments of deep

anxiety that Mahler has referred to as the *rapprochement crisis*, typically located between 18 and 20 to 24 months. At such times, the child's wishes and desires for separation, autonomy, and omnipotence are moderated by increasing awareness of the need for continued dependence on the mother, a situation that gives rise to a forerunner of the adult experience of ambivalence. In the final phase of separation-individuation, some resolution of the intense conflicts of the rapprochement phase is achieved through the child's consolidation of self-identity and attainment of *libidinal object constancy*. Object constancy, Mahler believed, is possible only when the maternal image becomes intrapsychically available to the child much in the same way the actual mother had been libidinally available—for sustenance, comfort, and love.

KOHUT'S "SELFOBJECT" THEORY

Selfobject theory is derived from a newer psychoanalytic framework, the *psychology of the self*, which is based on the contributions of Heinz Kohut. Unlike either Freud's theory of the libido or Mahler's separation-individuation theory, theories characterized as conflict-based, Kohut's is a *deficit-based* theory focused far more on the availability of certain kinds of psychological supplies thought to be necessary for the evolution of a vital and harmonious self. Kohut and his followers believed that such developmental supplies are made available through three major kinds of relational configurations, termed *selfobject relationships*, so named because they refer to a particular kind of relationship in which the object is actually experienced as an extension of the self, without psychological differentiation. The three selfobject experiences are *mirroring*, *idealizing*, and *partnering*. Each corresponds to a particular domain of self-experience: Mirroring experiences are associated with an intrapsychic structure known as the *archaic-grandiose self*, reflecting the need for approval, interest, and affirmation; idealizing experiences, with the *idealized parent imago*, reflecting the developmental need for closeness and support from an (idealized) other; and partnering experiences, with the *alter ego*, reflecting the need for contact with others who are felt to bear an essential likeness to the self. Collectively, these three domains are called the *tripolar self*.

Kohut, whose theoretical contributions and clinical innovations are far ranging, also placed considerable emphasis on the role of empathy in human development. He believed that children's capacity to feel themselves into the experience of another, also termed *vicarious introspection*, was only likely to develop in an environment in which the selfobjects are empathically resonant. At the same time, a critical impetus for healthy development of the self involves minor, relatively nontraumatic lapses in parental empathy. Such lapses, when they are *optimally* frustrating, motivate children to "take in" specific functions associated with the selfobjects (ranging from self-calming and self-soothing to pride in one's accomplishments) and shape them to suit their own unique needs. Referred to as "transmuting internalization," this critical intrapsychic developmental process makes possible a gradual, bit-by-bit translocation through which various selfobject functions become enduring parts of the child's own self-structure. The key elements of this sequence are, in order, *optimal frustration, increased tension, selfobject response, reduced tension, memory trace,* and *development of internal regulating structure*. Kohut, like Freud and Mahler, believed that the most critical developmental experiences occur in infancy and early childhood. However, he also maintained that even when healthy consolidation of self structures has culminated in a harmoniously functioning, "cohesive" self, the need for relational or external selfobject "supplies" is never fully extinguished and regularly re-emerges throughout the human life cycle.

—Jerrold R. Brandell

See also Conscience; Ego; Freud, Sigmund; Id; Superego

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Theoretical and clinical papers, psychoanalytic links, and other helpful information related to psychoanalytic developmental psychology, http://www.psychematters.com

PSYCHOPATHOLOGY

Psychopathology is often defined as the presence of mental illness or disease, but as a research endeavor, psychopathology can be understood more broadly to refer to the study of abnormal behavior. Defining behavior as abnormal, such that it might be termed a *mental disorder*, is an inherently challenging endeavor. The current edition of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)* defines a mental disorder as a psychological dysfunction that produces distress or impairment in functioning in the individual, while acknowledging that the boundaries of a term such as "mental disorder" are unclear. The behaviors constituting a mental disorder are conceptualized as a syndrome or pattern that represents a dysfunction in a behavioral, psychological, or biological aspect of human functioning.

DEFINING ABNORMAL BEHAVIOR

Historically, many approaches have been taken in differentiating abnormal from normal behavior. For example, a statistical definition of abnormal behavior would entail establishing quantifiable cutoffs for the behavior of interest in order to determine that they are statistically deviant from normal, or average. Another approach to defining abnormal behavior might be to label all behavior that deviates from the norms of society as characteristic of mental disorder. A third example may define abnormal behavior as anything that results in distress for an individual. All of these definitions have significant problems when taken in isolation, or when taken as a "gold standard" definition of abnormal behavior. The current definition in the *DSM-IV-TR* attempts to address some of these issues by specifying that behavior must be beyond an expected response (such as "normal" distress following the death of a loved one) and must not be behavior that is sanctioned by the individual's culture. Because there is no clear, consistent definition that would apply to the entire range of situations, it is likely that the definition of abnormal behavior will continue to evolve.

APPROACHES TO CLASSIFICATION

Three basic approaches might be used for the classification of psychopathology. A strictly *categorical* approach would divide disorders into mutually exclusive categories. Consistent with a categorical approach, each individual would either fall completely into the category or completely outside of it and would not be allowed to fall into more than one category. A second approach to classification is a *dimensional* approach, which assumes that disorders are better represented by dimensional continua. According to a dimensional approach, individuals can present with varying levels of different types of psychopathology, which may reflect, for example, different severities of the underlying pathology. In addition, unlike a categorical approach, in a dimensional approach individuals can be given a score on all dimensions in the system. Thus, more information is retained about individuals in a dimensional approach versus a strictly categorical approach.

The *DSM-IV-TR* is the primary classification system for mental disorders and uses a *prototypical* approach to classification. The organization of the *DSM* is loosely based on the medical model, with disorders divided into separate categories. Each category consists of lists of symptoms thought to define the disorder. In the prototypical approach, a certain number of symptoms for each disorder must be present for the individual to be deemed close enough to the "prototype" for diagnosis of a given disorder. In addition, within the *DSM* classification scheme, an individual can fall in more than one category. This phenomenon is referred to as *comorbidity*, so that an individual who meets diagnostic criteria for more than one disorder is said to be comorbid for the two disorders. Some major objections that have been raised about the present classification system are the loss of information about individuals by placing them in present versus absent categories, potentially detrimental social effects such as stigmatization based on the labels that are assigned,

dehumanizing effects of boxing people in the given categories, and the susceptibility of such labels to political and social influences.

UNDERSTANDING COMORBIDITY

Some researchers employing a dimensional approach to the classification of psychopathology have suggested that many common mental disorders may be conceptualized as undergirded by two dimensions, labeled *internalizing* and *externalizing*. The use of internalizing and externalizing as primary dimensions of psychopathology has been predominant in research and practice with children and adolescents for some time, but recent research shows that these constructs are also applicable to adult psychopathology. Research on comorbidity suggests that certain groups of disorders are more likely to co-occur in the same adults. Specifically, the *internalizing* dimension in adults encompasses mood, anxiety, and somatic disorders, whereas the *externalizing* dimension encompasses substance use disorders and disorders characterized by antisocial behavior. Other major groups of disorders that are included in the *DSM-IV-TR* include schizophrenia and other psychotic disorders, cognitive disorders such as dementia, eating disorders, and dissociative disorders. Seeing how these disorders fit in with, or extend, the internalizing-externalizing model remains an important direction for future research.

APPROACHES TO STUDYING PSYCHOPATHOLOGY

Major theoretical approaches to studying psychopathology are largely defined based on presumed causal factors of psychopathology. One common way of discussing the etiology of psychopathology is the *diathesis-stress* model. The diathesis-stress model states that the development of psychopathology occurs when an individual has a diathesis, such as a biological predisposition, toward a disorder and also encounters stress, or environmental factors that interact with the diathesis to produce the onset of a disorder. Although the diathesis-stress model is typically regarded as a general model that may help us understand the development of many types of psychopathology, most psychopathology researchers align themselves with a more specific school of thought regarding the etiology of psychopathology in order to frame their research.

The predominant schools of thought regarding the origins of mental disorders are the biological approach, the psychosocial approach, and the sociocultural approach. The biological approach to understanding etiology, or causal factors, of psychopathology has been gaining attention, in part because of the many recent scientific advances in fields such as genetics and neuroscience. Support for the biological approach has come from research suggesting that neurotransmitter and hormonal imbalances are linked to certain mental disorders, that many types of psychopathology show substantial genetic influence, and that abnormalities in brain structure and function influence the development of psychopathology. Research methods such as behavioral genetic techniques, which estimate the genetic and environmental influences on a particular trait or disorder, and neuroimaging techniques such as functional magnetic resonance imaging are common research methods used to investigate the etiology of psychopathology from a biological perspective.

The psychosocial approach encompasses a wide variety of viewpoints, including approaches based on psychodynamic and behavioral theories. The psychodynamic approach extends classic psychoanalytic theory, which suggests that early childhood experiences, especially extreme experiences such as deprivation or trauma, play a significant role in shaping later development of psychopathology. This viewpoint emphasizes unconscious processes, such as various methods of coping (often referred to as *defense mechanisms*) with internal conflict and resulting anxiety. From a behavioral perspective, aspects of a person's environment play a central role in learning behaviors, thus in developing, maintaining, and ultimately treating different types of psychopathology. That is, a behavioral approach to understanding psychopathology would seek to identify aspects of the environment that trigger, cause, or exacerbate various psychopathological symptoms. Finally, a sociocultural approach emphasizes aspects of an individual's society and culture that contribute to the development of psychopathology. Epidemiological, or population-based, research has been particularly informative to a sociocultural perspective by providing information on the prevalence and distribution of disorders over time and across various cultures and societies.

—Jennifer L. Tackett and Robert F. Krueger

See also Depression

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PSYCHOPHARMACOLOGY

Psychopharmacology is an inclusive term referring to the study of the effects of endogenous or exogenous chemicals on the central nervous system and the resulting neuropsychiatric manifestations. Pharmacologic agents of interest include endogenous neurotransmitters such as norepinephrine and serotonin, therapeutic agents such as antipsychotic and antidepressant drugs, and drugs of abuse such as cocaine and opioids. Some agents of interest have not been developed as therapeutic agents but have been useful to identify receptors or elucidate mechanisms of action. The term psychopharmacology is generally applied to both this molecular approach and to clinical manifestations of drugs and of neurotransmitter imbalance.

Psychiatric effects of drugs have been of interest since pharmacology emerged as a science, and the discipline of psychopharmacology can be said to have matured in the mid-20th century with the advent of antipsychotic agents, of which chlorpromazine is the classic example. It was recognized at that time that all these agents had in common the effect of antagonizing the pharmacologic effects of dopamine, and the theory of "dopaminergic excess" began to be evoked as the principal theory of schizophrenia. At that time, differentiation of receptor subtypes was unknown, as were the relationships of receptor types to specific neural pathways in the brain. The identification of receptor types and subtypes with specific neural pathways, and the behavioral aspects of specific pathways, are still imperfectly understood despite intensive work during the past 50 years.

Concurrent with the emergence of antipsychotic agents, the development of tricyclic antidepressant agents proceeded rapidly, with about a dozen drugs available by 1970. The drugs in this category are either secondary or tertiary amines. These early drugs brought about clinical relief of depression through blockade of the reuptake of principally epinephrine (tertiary amines) or norepinephrine (secondary amines, many of which are metabolites of the tertiary amine drugs). Normally, the neurotransmitters are released from the stimulating neuron in a neural pathway, cross the synapse, and occupy and activate receptors on the postsynaptic cell, after which they leave the receptors in a dynamic process of two-way mass transfer (diffusion) and are reabsorbed by the presynaptic cell. The blockade of such reuptake causes a greater quantity of neurotransmitter to remain in the synapse and reoccupy postsynaptic receptors, the gross effect being a general stimulatory effect of the pathway in question; hence, the intuitive utility of these drugs to reverse the low neural activity thought to accompany or cause clinical depression.

Extensive and increasingly specific research has elaborated on these basic models of schizophrenia and depression by discovering a multitude of receptor subtypes specific to individual neural pathways and identification of these pathways' behavioral and cognitive functions. Many endogenous substances whose principal function is other than neurological have also been found to function as neurotransmitters in the brain; examples include corticotropin and angiotensin II. The proliferation of this information has led to the development of "atypical" antipsychotic and antidepressant agents (i.e., those acting primarily on other than dopaminergic or adrenergic systems); at this writing, the exact mechanism of action of many of these drugs is largely unknown.

Since the 1990s, intense attention has also been directed toward pharmacologic mechanisms in other psychiatric disorders. Study of the neural pathways associated with generalized anxiety has yielded progress in the clinical management of generalized anxiety disorders, posttraumatic stress disorder, and the anxiety associated with depression and other syndromes. For example, identification of the "pleasure centers" or "reward centers" of the brain and their association with the neurotransmitter serotonin have been followed by the development of drugs effective in treating tobacco, alcohol, and opioid addiction.

At a systems level, psychopharmacology includes pharmacokinetics (the study of the absorption, distribution, metabolism, and elimination of neurologically active drugs) and pharmacodynamics (the description of the relationship of drug concentrations in the blood and at receptors to pharmacologic effects). Such studies typically occur first in animals, then in small studies of human subjects in Phase I of the U.S. Food and Drug Administration hierarchy of drug development. Additional information is gained through Phase II and III clinical trials with larger numbers of subjects, where aberrant, infrequent, or unexpected clinical effects may be detected; these include drug-food and drug-drug interactions and the effect of disease states on the pharmacokinetics of drugs. The interaction of drugs with other than the target receptors or neural pathways gives rise to side effects and adverse effects of the drugs. The discipline attempts to determine the scientific basis for such effects, some of which bear no apparent relationship to the drug's supposed mechanism of action. Studies of adverse effects of drugs have revealed much about interindividual variations in the response to drugs and have contributed importantly to knowledge of differences in inheritance patterns of drug-metabolizing enzymes, receptor subtypes, and perhaps differences in underlying disease mechanisms.

Finally, at the clinical level, psychopharmacology as a discipline involves the selection of appropriate therapeutic agents for individual patients. Therapeutic and side-effect responses to drugs are affected not only by inherited differences in metabolic pathways, but also by age, gender, nutritional status, and, perhaps most important, concurrent disease states. The selection of an appropriate therapeutic agent must involve consideration of the effects of comorbid conditions on drug-clearing organs, conditions such as acid-base disturbances that alter drug distribution, the presence of other drugs and their effects on organ systems, and individual variability in the manifestations of the underlying disease. An example of the latter is schizophrenic hallucinations; usually, these are auditory and respond to dopaminergic agents, but visual hallucinations that respond better to serotonergic agents also occur. Finally, patient choices regarding dosage schedules, cost, tolerability of adverse effects, and other personal issues are important because these affect the degree of the patient's compliance with dosing instructions.

Recently, the work of basic scientists, physicians, clinical pharmacologists, and clinical pharmacists has expanded to include more extensive studies in elderly patients, women, and children, groups traditionally underrepresented in the drug development process. This is partly because of the late recognition that clinical depression is common in children and adolescents and that age and gender effects on pharmacology and pharmacokinetics exist for many drugs.

As work progresses, the term psychopharmacology will probably be less specific as subdisciplines emerge from this field.

—Roy Parish

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PSYCHOSOCIAL DEVELOPMENT

Psychosocial development refers to the interaction of both psychological and social forces over the development of individuals across the life span. It is in the domain of socialization influences. The best known single, unifying theory of these concepts was formulated by Erik H. Erikson (1902–1994). Psychosocial development may also include changes in altruistic, prosocial behavior and self-control.

ERIKSON'S THEORY

Unlike Sigmund Freud, Erikson's theory describes development across the life span. His eight stages cover the psychological tasks that all individuals face from infancy through old age. Erikson's theory addresses issues about how personality develops and how people acquire their identity and role as a member of society. Erikson's emphasis on the psychosocial, rather than the Freudian psychosexual, orientation reminds us that the ego aspect of personality is actively involved in developing skills and attitudes to be a productive, responsible citizen.

Erikson's theory, sometimes referred to as "the stages of man," is based on a belief that individuals form self-images (an identity) from both self-perceptions and others' perceptions. His is one of the few

Table 1 Erik Erikson's Theory of Psychosocial Development

Stage or "Crisis"	*Approximate Age Range*	*Important Event*	*"Desired" Outcome/Trait*	*"Negative" Outcome*
I. Basic trust v. mistrust	Birth–18 months	Feeding, attachment	Hope	Fear, mistrust of others
II. Autonomy v. shame/doubt	18–36 months	Toilet training	Willpower	Self-doubt
III. Initiative v. guilt	3–6 years	Independence	Purpose	Guilt about thought and actions
IV. Industry v. inferiority	6–12 years	School demands	Competence	Lack of competence
V. Identity v. role confusion	12–20 years	Identity and peer relations	Fidelity	Inability to establish a sense of self
VI. Intimacy v. isolation	20–40 years	Love relations	Love	Fear of intimacy
VII. Generativity v. stagnation	40–65 years	Parenting, mentoring	Care	Self-absorption
VIII. Ego integrity v. despair	65–death	Reflection and acceptance	Wisdom	Regret and doubt

psychological theories to account for a person's place in history; everyone must accept responsibility for their individualized outcome that results from person-environment relationships. His theory is presented as a series of stages, each having a dilemma or crisis to be resolved.

People pass through these stages independent of whether they have achieved a resolution. Unresolved conflicts or difficulties are passed on to later stages, which can make their outcome more challenging.

Erikson's theory has been described as a continuum of crises faced over the course of human development. A new crisis or dilemma emerges as people grow and confront new psychological tasks and responsibilities. These tasks are listed in Table 1 as important events. Crises may be seen as opportunities from which to grow and attain positive outcomes, or as misfortunes that can lead to a failed, negative resolution. From each stage, a desired psychological attribute may be acquired. Table 1 summarizes Erikson's theory.

Most data and research interest have been given to stages I, V and VII. In stage I, *basic trust versus mistrust*, infants, in interactions with their caregivers, learn about the world. They must decide whether there is love and security, leading to a basic trust, or whether their needs are not met and the world is unpredictable, leading to fear and mistrust. This stage corresponds to an entire literature on the importance of attachment as a basic task of infancy. Attachment quality becomes a foundation for all future relationships the person will have over his or her life. The work of Mary Ainsworth is important to note here. She first described the various types of attachment outcomes that emerge as a result of the parent-infant interactions over the first years of life. So-called secure or insecure attachments underlie the concept of trust versus mistrust.

In the second stage, *autonomy versus shame and doubt*, Erikson states that children begin to acquire a sense of independent, self-directed behavior, often evidenced by the "terrible 2s" and use of the word, "no." Children who are overdisciplined or otherwise discouraged to be autonomous will develop shame and doubt about their new abilities.

The third stage, *initiative versus guilt*, is characterized by the toddler's need to learn and acquire self-control against the backdrop of developing many new abilities and skills. Initiative refers to the burgeoning autonomy and independence that leads to exploring all parts of their world. Guilt and unworthiness result when the toddler holds himself back because of over-control of his impulses and fantasies.

Stage IV is termed *industry versus inferiority*. This stage is marked by school-age children who are gaining abilities in a wide variety of tasks—projects with which they make things, learn to use tools, and gain a variety of skills. Inferiority and inadequacy result if the child does not master age-appropriate abilities and feels inadequate.

In stage V, *identity versus role confusion*, teens face decisions about their future role in life and who they are. This is a crucial stage in determining overall quality of life and may be associated with great turmoil. The need for appropriate role models and influences, as well as experiences, is obvious. James Marcia has written about four possible identity outcomes—achievement, moratorium, foreclosure, and diffusion. Marcia's work has extended, modernized, and elaborated on Erikson's fifth stage.

According to Marcia, a positive outcome, identity achievement, occurs after the teen has had opportunities to explore options and has committed to a set of values or goals. A teen or young adult who is still experimenting without any commitments is said to be in a moratorium or holding pattern. One who commits to a set of values without challenge or exploration has reached foreclosure. Finally, a person who lacks direction because of lack of exploration and commitment is said to be diffused. Failure to resolve these identity questions can result in a rebellious, disorienting outcome related to acting out and experimenting with risky behavior.

In the sixth stage, *intimacy versus isolation*, Erikson states that the healthy individual needs to share himself and commit to another. At one time, this meant marriage, but a contemporary take would refer to any long-term intimate, committed relationship. Intimacy with another completes a person and adds to who they are. Failure to achieve intimacy leads to loneliness.

In stage VII, *generativity versus stagnation*, the middle-age adult attempts to give back to the next generation what they will need to develop successfully. Marriage and parenthood are the important life events to be managed. Generativity refers to nurturant, supportive behaviors such as child rearing, caring for others, and productive, meaningful work such as community service. The generative adult wishes to create something of lasting value. Generativity refers to caring behaviors to guide the next generation—mentoring, teaching, and parenting. If one does not engage in these behaviors, the result can be self-absorption and an emotionally impoverished existence, which Erikson termed *stagnation*. Stagnation is an empty feeling, referred to as an absence of meaningful accomplishment.

The final stage, *ego integrity versus despair*, is the time when an individual looks back on a complete lifetime and prepares for death. A person with ego integrity attains total self-hood, a sense of a life well lived. Despair results if a person obsesses over all their loss of roles as they age.

As can be seen by this review, Erikson's theory captures the process of socialization over the lifetime. His theory remains influential as a source of insightful descriptions of the course of human development. Other important psychosocial variables also affect personal growth and psychological well-being.

OTHER PSYCHOSOCIAL DEVELOPMENTAL VARIABLES

Altruism or *prosocial behavior* is a key process related to psychosocial development. Altruism and prosocial behavior as used here are synonymous; these terms refer to behaviors that benefit another without an expected reward in return. Both are rooted in empathy, the ability to comprehend another person's emotional status and be able to identify and feel the way that another person feels. Behaviorally, empathy refers to a person responding emotionally in support of the other. (Sympathy, a different characteristic, refers to feelings of concern for another's situation.)

In childhood, prosocial behavior is usually associated with sociable, competent children who are also able to regulate their emotions. Parenting and role models play a key role in the development of prosocial behaviors and attitudes. Parents who are warm and responsive and show sympathy lay the groundwork for appropriate responses in their children. These responses persist into the teen years and beyond.

Self-control refers to an individual's capacity to resist an impulse to engage in socially disapproved or unacceptable behavior. It is an essential characteristic for citizenship, morality, and positive social relations. Self-control first emerges in infancy as seen by compliance behaviors. In early childhood, comparable to Erikson's stage II, children learn to obey adult commands and to comply with authority. Appropriate, warm and responsive parenting will create an environment in which the toddler wants to please the adults. In doing so, the child acquires a positive, eager spirit of cooperation within the development of autonomy and self-directed behavior.

Self-control has been found to be stable throughout childhood and adolescence. Authoritative parenting, coupled with appropriate modeling, tends to produce the best outcome—good frustration tolerance, control of emotions, and low impulsivity. In adulthood, these traits are associated with success across every facet of life—in family and peer relationships, at work and in career achievement, and overall life satisfaction.

—Joseph D. Sclafani

See also Erikson, Erik

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PUBERTY

What signifies the beginning of puberty, a hallmark of the stage of adolescence? For the girl, the first menstruation is often considered the beginning of puberty, but even before it can occur, the sex organs have to develop, and secondary sex characteristics (the nongenital physical features that distinguish men from women) will begin to appear. In the boy, semen, pubic hair, a lower voice, and growth of the penis and testes are often taken as signs of the onset of puberty, but about 1 to 2 years before the outward signs appear, the gonads begin secreting androgen in boys and estrogen in girls. These hormones initiate the striking physical and mental changes of adolescence.

STAGES OF PUBERTY

Puberty can be divided into three stages. In the prepubescent stage, the secondary sex characteristics begin to develop, but the reproductive organs do not yet function. In the pubescent stage, the secondary sex characteristics continue to develop, and the reproductive organs become capable of producing ova and sperm. In the postpubescent stage, the secondary sex characteristics are well developed, and the sex organs are capable of adult functioning. The great majority of American girls have their first menstruation, an event known as menarche, between the ages of 11 and 15. In the United States, the mean age is 12.7 years.

PRIMARY SEX CHARACTERISTICS

The male testes are present at birth, but are only about 10% of their mature size. They grow rapidly during the first 1 or 2 years of puberty, and then grow more slowly, not reaching mature size until the age of 20 or 21. Shortly after the testes begin to develop, the penis starts to grow in length, and the seminal ducts and the prostate gland enlarge. Although the penis is capable of erection by means of contact from birth, only during adolescence does it begin to erect spontaneously or in response to sexually provocative sights, sounds, and thoughts.

The female's uterus, fallopian tubes, and vagina also grow rapidly through puberty. The ovaries grow during puberty, too, and although they begin to function about midway through the period, they do not reach full adult size until the age of 20 or 21. The ovaries produce ova and secrete the hormones needed for pregnancy, menstruation, and the development of the secondary sex characteristics.

Following menarche, menstruation may come at irregular intervals at first. For 6 months to 1 year or more, ovulation may not always occur. Headaches, backaches, and cramps sometimes accompany the early menstrual periods, and the girl may feel tired, depressed, and irritable. As menstruation becomes more regular, these physical and psychological symptoms often diminish or disappear entirely. A good deal of attention has been paid to a reaction called *premenstrual syndrome* (PMS), in which the buildup and concentration of hormones in the woman's body can lead to dramatic changes in personality. There is some evidence that the changes that accompany PMS may be as much a result of changes surrounding the social world of the adolescent female as changes in hormones. For example, peer and other pressures (from parents and from school commitments) may exacerbate, or even be the source of, many of the adolescent

mood swings that may be experienced. The biological changes that accompany PMS, along with these other difficulties, make navigating through an ordinarily challenging day even more difficult.

SECONDARY SEX CHARACTERISTICS

The secondary sex characteristics involving breasts, body hair, and voice changes are not directly related to sperm or ovum production. The secondary sex characteristic that first develops in boys is sparse patches of light-colored, straight pubic hair. This hair takes on its characteristically dark, curly appearance after 1 or 2 years. Axillary or underarm and facial hair begins to appear when the pubic hair has almost fully grown. Like pubic hair, this hair at first is light-colored, fine, and sparse. As for facial hair, few boys find that they need to shave before they are 16 or so. Hair also appears on the arms, legs, and shoulders, and later on the chest. Body hair continues to develop for some time, often into adulthood; the amount and density of hair are determined by heredity.

People's skin becomes coarser and thicker during puberty. The sebaceous, or fatty, glands in the skin become active at this time and produce an oily secretion, as individuals suffering from acne know all too well. The sweat *glands* in the armpits begin to function even before the axillary hair appears, and the amount and odor of perspiration increase.

Perhaps the most noticeable change in boys is the deepening of the voice. Usually by the time a boy is 13, his voice has become husky. Only at about age 16 or 17 does it begin to "crack." This may last for 1 or 2 years, until the voice change is complete. The voice change occurs because the male hormones cause the larynx to enlarge and the vocal cords to lengthen. Later in adolescence, the male voice drops an octave or more in pitch, increases in volume, and develops a more even tonal quality.

Girls' secondary sex characteristics generally develop in the same sequence as boys. The first indication of approaching sexual maturity in a girl is change in the shape and size of her hips, which grow wider and rounder. This development is caused in part by enlargement of the pelvic bone and in part by the thickening of the fat that lies under the skin. Both of these changes have their basis in preparation for childbirth. A wider pelvis makes childbirth easier, and additional fat ensures adequate nutrition for the developing baby.

Soon after a girl's hips start to develop, her breasts begin to grow. The first stage of breast development is the bud stage, in which the nipple elevates slightly and the surrounding areola becomes fuller. This occurs at an average age of 10 or 11. Before the menarche, there is an increase in the amount of fat underlying the nipple and the areola, and the breast rises in a conical shape. After menarche, the breasts become larger and rounder with the development of the mammary glands. Girls also experience hair growth in the pubic area, underarms, and legs. The extent of all these changes varies with the individual.

CHANGING GROWTH PATTERNS

Children in widely separated parts of the world seem to be reaching puberty earlier than their parents did, and growing taller and heavier as well. What might be the causes of these trends?

Records show that in America, a young man will, on the average, be 1 inch taller and 10 pounds heavier than his father was. A young woman will probably be almost an inch taller than her mother and 2 pounds heavier and will reach menarche 10 months earlier than her mother did. Today's adolescents are also reaching full adult height earlier than their ancestors. A century ago, boys did not reach full height until age 23 or 24, but now an adolescent boy stops growing by about the age of 18 or 19. At the turn of the century, girls reached full height at the age of 18, whereas the modern girl stops growing at age 16. Evidence of this increase in size can be seen in the clothing and furnishings of past generations. A modern family would find the furniture of a house in colonial Williamsburg far too small. The armor worn by medieval warriors would cramp a modern boy of 12. The first colonists who settled in Jamestown more than 200 years ago were, on the average, less than 5 feet tall.

In addition to growing bigger in height and weight, recent generations also mature earlier than their ancestors did, so that puberty begins at a younger age. This is not a recent phenomenon, nor is it confined to America. Children in China, New Zealand, Italy, and Poland are reaching maturity earlier, and the trend seems to be operating in all populations of these countries. Many studies in recent years have used the menarche as the criterion for tracing this trend.

In Scandinavia, England, and America, the age at menarche has been getting steadily younger at the rate of one-third to one-half year per decade, and the

menarche is continuing to arrive earlier. In 1840, Norwegian girls reached menarche at an average age of 17. Since then, the menarche has arrived about 4 months earlier per decade, and today the average Norwegian girl begins to menstruate before her 13th birthday. The female's body is probably programmed in such a way that ova will not be released until the body has enough weight as food to support and nourish an embryo. People nowadays reach that weight (about 106 pounds) earlier in life than they did several decades ago. A set of factors other than nutrition that have been associated with the decreased age at menarche are socioeconomic conditions, number of siblings, race, and especially stress.

With these physical changes has come a correspondingly earlier age of social and intellectual maturity. Sometimes parents do not realize that when they were adolescents, they may have been less mature physically as well as socially than their children are at the same chronological age. Failure to recognize changes in growth patterns (as well as individual variations in development) has led to the *myth of chronological age*. To think about the ages that an adolescent juggles biological, social, emotional, intellectual, and academic concerns makes a mockery of chronological age. To be told that someone is 13 is to be told just about nothing except perhaps grade level in school. In other words, age actually only records the passage of time and tells us nothing about the events that take place within that time period.

Better diet in the 20th century is also a probable cause of earlier maturity. Improvements in agricultural technology have increased crop yields and caloric intake in much of the world. Throughout history, the children of the upper classes have tended to be larger and to reach maturity faster than the children of the lower classes. Upper-class children are growing bigger and maturing sooner these days, too, but children of poorer families have shown a more striking change (perhaps because they have farther to go to reach the norm).

Immunization, a lower incidence of serious childhood diseases, and better general health care (especially during the prenatal period) are all probable factors in promoting growth and maturity among all classes. The recent trend toward smaller families is also associated with the trend in growth patterns. Children in smaller families tend to be larger and better developed than children in large families. The fact that in smaller families there are more food and medical resources available may contribute to the differences. There is also some speculation that fewer births are easier on the woman and deplete less of what she can biologically give to the child.

Will these trends continue indefinitely? Animal species other than ours seem to have an upper limit on body size, so anthropologists predict that the size of humans, too, will eventually stabilize. Some researchers claim that the trend toward increasingly earlier physical maturity has already ended.

VARYING RATES OF DEVELOPMENT

Within any age group of adolescents, one can observe significant variations in physical maturity and concomitant variations in areas of emotional and intellectual development. One researcher explains that there is no more variable group that we can deal with than adolescents, especially young adolescents. Because of this extreme variability, there can be a 6-year span in biological development between a quickly developing girl and a slowly developing boy, and here I am only talking about biological age.

Early-maturing boys are taller, heavier, and more muscular than their age mates. They tend to excel at sports, achieve popularity, and become leaders in student government and extracurricular activities. Early-maturing boys also tend to be more interested in girls and gain the advantage of acquiring social graces early. In adult life, they are likely to be more successful socially and vocationally and to be more conventional in career and lifestyle choices.

Early-maturing girls are faced with the problem that few other girls and almost no boys are as tall and well developed as they are. Friends may avoid them simply because they are bigger. Early-maturing girls tend to date older boys until their peers catch up with them.

Late-maturing boys are smaller and less well developed than almost everyone in their age group. They may lack interest in dating, and when they do become interested in girls, they often lack social graces or are rebuffed by the prettiest and most popular girls. Late-maturing boys tend to participate in extracurricular activities such as band, the chess club, or the school newspaper, where their lack of physical maturity is not a drawback. In adult life, they tend to be insightful, independent, and less conventionally successful. Little has been written about late-maturing girls, perhaps because they still mature before many

of the boys. Late-maturing girls do not face the problems that confront late-maturing boys, but they may be at some social disadvantages if they are less attractive to boys than other girls are.

Although these observations are general, it should be emphasized that rates of growth in various areas of development are not synchronized. For example, a young woman who becomes physically mature more rapidly than her age mates may still be much younger emotionally and socially.

—Neil J. Salkind

See also Adolescence

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PUBLIC POLICY

Social science disciplines concerned with human development have a long, if turbulent, history of interaction with public policy. The origins of current day relations between developmental science and public policy are usually traced back to the reform movements of the late 1800s and early 1900s focused on the urban poor, public health, labor conditions, and juvenile crime. Those seeking social reform explicitly harnessed the evidence provided by those seeking to understand human development for the purpose of improving lives and, thereby, improving society. Their efforts led to the first laws governing child labor, maternal and child health, and compulsory education, as well as to social institutions such as public health and child guidance clinics and the juvenile courts. Since this time, the relationship between the scientific study of human development and public policy has experienced periods of retrenchment initiated by, for example, the emergence of positivist social science during the 1920s, and periods of intensive collaboration led in by, for example, the "war on poverty" of the 1960s and, more recently, education, juvenile justice, and welfare reform. This tension between social science as an arms-length, objective endeavor and as an explicit tool of social reform remains an abiding dilemma facing the human development and public policy enterprise.

WHAT IS PUBLIC POLICY?

Public policy addresses legal, legislative, and administrative decision making at all levels of government. The range and complexity of the activities this encompasses have confounded efforts to place clear boundaries around the domain of public policy. It can concern a vote in the U.S. Congress or a city council, a court decision, the issuance of regulations guiding implementation of a law, the appointment of an agency director, or an Executive Order. The nature of the human policy issues in question include the familiar domains of health and nutrition, education, labor, social security, and welfare, but also encompass transportation (e.g., seat belt and maximum speed laws), taxation (e.g., child tax credit), agricultural (e.g., use of pesticides), immigration (e.g., family reunification), and defense (e.g., military child care) issues.

Rational models trace the policy process from the transformation of a social problem into a policy issue through to the implementation and evaluation of an enacted policy. In practice, it is difficult to portray the complex dynamics of public policy making. Public policies are not "made" at some discernable place and time, but rather are the product of numerous decisions fashioned incrementally over a prolonged period of time. The process inevitably involves a heterogeneous, largely uncoordinated, and vast number of participants with differing roles, agendas, values, and capacities for influence and thus centers on resolving conflicts of interest. Policies and laws are shaped by a variety of conditions, events, and actors that are intricately, but not logically, interwoven. As a result, rational models must be complemented by portrayals that capture the unpredictability, fragmentation, contentiousness, and multiple influences that bear on the policy process.

SCIENCE-POLICY INTERSECTION

As many have pointed out, this characterization of the policy process contrasts sharply with basic

elements of the scientific process. It has been noted, for example, that science seeks truth, legal procedures seek justice, and legislative policy seeks allies. The scientific method attempts to screen out the influence of personal values, whereas the policy process explicitly contends with competing values. Science has led to views of human behavior as multiply determined; policy and legal debates tend to hold individuals responsible for their actions. Rules of evidence also vary dramatically across these differing arenas. Yet, science and policy are both conservative, incremental processes. They attempt to be cumulative insofar as major questions and issues are revisited over time in light of new developments. Policies, like scientific research, are based on hypotheses about human behavior and the actions—interventions, tax incentives, sanctions—that will affect it. Thus, despite a measure of mutual skepticism among those who function in these two realms, there is also substantial common ground.

RATIONALES FOR HUMAN DEVELOPMENT POLICY

Policy involvement in matters of human development derives primarily from two rationales. Police power justifies intervention when public safety is placed at risk. *Parens patriae* (literally, the State as parent) provides the framework for government intervention in the lives of dependent children whose family circumstances place them at risk, as well as for impaired adults. As exemplified by juvenile justice and child welfare (e.g., foster care) policies, these rationales often cast government involvement as a last resort when private (i.e., family) solutions to problems have failed and draw attention away from preventive interventions.

Other rationales, which place a greater emphasis on promoting social goals and avoiding social costs (rather than on preventing harm to individuals), have also been used to argue successfully for policy involvement in human development. A significant legacy of the civil rights movement is a set of policies designed to promote equal opportunity that extend to employment and disability issues. Public education also carries this banner, although the federal role in education remains largely focused on children who are poor or who have disabilities, and thus continues to invoke *parens patraie*. Public health policy emphasizes the avoidance of health and economic costs to the broader society.

Policy for America's aged is somewhat unique in that economic dependency is an inevitable aspect of old age; a condition that occurs through no fault of their own, presumably after a lengthy period of economic contribution. As a result, benefits such as Social Security and Medicare do not carry the ambivalence or stigma that accompany many public benefits for younger populations. Rather, they were established as a right or entitlement, not an act of benevolence; are designed not only to relieve old-age dependency, but to prevent it; and now approach universal coverage.

CONTRIBUTIONS OF RESEARCH

Efforts to identify the salient forces that shape public policy have assigned research a relatively minor, although not inconsequential, role. It competes with (1) contextual factors, including social, economic, demographic, political, and ideological influences, that shape the overall context of policymaking at any given time; (2) constituency pressures exerted by both organized and unorganized individuals and groups; (3) principles and ideas that shape policymakers' visions and policy goals; (4) institutions and institutional actors that establish the infrastructure within which the power to shape policy is defined; and (5) the media and its powerful ability to shape what people think about as well as their opinions about salient issues. All these forces, including research, intersect and interact against the backdrop of existing policy and legal precedent established through prior court decisions, prevailing legal doctrine, and existing legislative frameworks.

The contributions of research, as it enters this mix of influences, have been loosely categorized as (1) knowledge building: contributing to the fundamental understanding of social and behavioral processes, (2) problem-exploring: contributing to the definition of social problems, (3) policy-forming: contributing to the formulation of policies or the resolution of legal questions addressing specific social problems, and (4) program-directing and evaluating: contributing to the design, evaluation, and improvement of established policies and programs.

Across these broad categories of policy-relevant research, efforts to understand how research is used to inform, shape, or support public policy have identified two contrasting models. The first focuses on direct, instrumental applications of research on human development to the resolution of pending legal or

policy decision. Submission of amicus briefs and presentation of expert testimony provide clear examples of instrumental applications. The second "enlightenment" model of research utilization emphasizes more subtle, indirect, and circuitous applications by which, for example, generalized evidence from multiple studies (e.g., mental health problems are a deterrent to welfare reform; the reliability of eyewitness testimony is highly situation specific) or concepts derived from research on human development (e.g., successful aging, social capital) shape policymakers' views about issues that warrant their attention and their instincts about how best to address them. Examples of both direct and indirect uses are plentiful, and each can be—and has been—used to promote, delay, or prevent action on a policy issue.

As with virtually all factors that contribute to public policy, research is most likely to play a role when its findings coincide with constituency interests, prevailing values, and other important influences. Case studies of individuals in various policy roles have revealed that the timeliness and relevance of the findings to an active policy debate are prerequisites for use. The perceived quality of the research and its "fit" with the users' prior perceptions and values foster trust in the research and thus enhance its potential for utilization. Its application is then affected by the extent to which the presentation of the research articulates possibilities for action or, at a minimum, studies variables that policymakers can manipulate (e.g., maternal education as distinct from maternal warmth) as well as by its potential to raise new issues for consideration or new perspectives on more long-standing issues.

The circumstances that prevail when research is introduced into the process are also important. Policymakers are more likely to turn to research evidence when confronted with an unfamiliar issue on which they have not formed an opinion (e.g., acquired immunodeficiency syndrome [AIDS] in the 1980s, child witness testimony in the 1980s and 1990s), dealing with a highly contentious policy for which a "sympathetic" empirical finding might tip the balance of opinion or discredit the opponents' arguments (e.g., welfare or health care reform, immigration policy, discrimination law), or seeking to delay action by asserting that research is inconclusive or insufficient to justify policy intervention. These circumstances challenge researchers to maintain credibility in the scientific and policy arenas by advocating the appropriate use of their findings while articulating the limits of their data.

It is now recognized that the relation between science and policy is characterized by interdependence and mutual interests. The exchange brings vital funding for training and research on human development, policies that facilitate empirical inquiry, public relevance, and opportunities for social as well as scientific impact. The ongoing challenge is one of understanding differences between these two enterprises, acknowledging the constraints and opportunities that confront those who operate within them, and constructing an effective working relationship in the service of making a difference in the lives of those we study.

—Deborah A. Phillips, Jennifer Woolard, and Amy Sussman

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PUNISHMENT

According to B. F. Skinner's learning theory model, punishment is a procedure involving the arrangement of stimulus conditions, referred to as

consequences, for the purpose of reducing or eliminating one or more behaviors being exhibited by some human or nonhuman animal. There are two basic types of punishment: positive and negative. Positive punishment is the application of an unpleasant (undesirable) stimulus contingent on a response for the purpose of decreasing the frequency of that response. Negative punishment is the removal of a pleasant (desirable) stimulus contingent on a response for the purpose of decreasing the frequency of that response. Positive and negative punishing stimuli may be equally effective, depending on the value the organism associates with the stimuli.

Punishing stimuli may be extrinsic (e.g., doing something wrong and being put in "time-out") or intrinsic (e.g., doing something wrong and having internal feelings of remorse) in nature. A punishing stimulus may be defined as natural (e.g., the result of a natural cause-and-effect relationship such as a hand being burned when placed on a hot stove) or contrived (e.g., a child loses his opportunity to play video games because he hit his brother). Natural and contrived punishing stimuli may be equally effective, depending on the value the individual associates with the punishing stimuli.

—Paul W. Robinson

See also Reinforcement, Spanking

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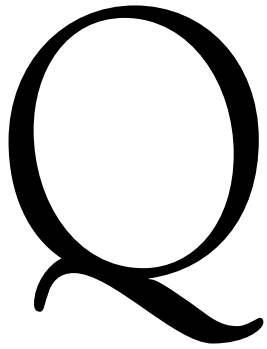

Qualitative Methods

Formal symbolic representation of qualitative entities is doomed to its rightful place of minor significance in a world where flowers and beautiful women abound.

—Albert Einstein

QUALITATIVE METHODS

Qualitative methods include a wide array of scientific methods designed to describe and/or understand patterns related to people's behaviors, thoughts, experiences, or emotions. The goal is often to look for similarities (or differences) within (or across) places (or time).

Qualitative methods are different from experimental methods in that experimental methods artificially control the environment where the research question is studied and then alter one or a few conditions within that controlled environment. The goal of experimental methods is often to predict a small subset of behavior. Another difference is that researchers who ascribe to a *logical positivist* philosophy of science, or believe that there is a truth that can be discovered, often use experimental methods. Researchers who ascribe to a *post-positivist*, *critical*, or *constructivist* philosophy of science, on the other hand, often use qualitative methods. Though these are three different philosophies of science, all theorize multiple truths and hold that there are ways of learning about phenomena of interest other than through artificial manipulation and control. Qualitative methods open up other possibilities for inquiry, allowing different kinds of questions to be addressed.

A similarity between experimental and qualitative methods is that both follow a scientific methodology. With qualitative methods, data are collected through observation, interview procedure, or collecting artifacts. Data are analyzed systematically, and the results are reported. There are several types of qualitative methods, several ways to analyze qualitative data, and several ways to evaluate the methods.

TYPES OF QUALITATIVE METHODS

Some qualitative methods are interviews, observation, action research, and archival research. These methods may have a quantitative (scaled numbers) component to them and thus should not be characterized exclusively as qualitative.

Interviews

Interviews may be done with one person or with a group. *Individual interviews* are used generally when the topic area is private or personal or when the researcher is interested in getting in-depth information. *Focus groups* are often used when the researcher wants to gather a variety of opinions, ideas, or experiences; when group dynamics are of interest; or when the researcher believes the group setting will help participants generate more information.

There are a few options with respect to interview questions. The researcher may choose a *structured format*, where all of the questions are determined beforehand and participants do not help to determine the focus of the interview. With a *semistructured format*, the general areas are determined beforehand but the researcher may ask different questions depending on the direction of the interview. Participants' responses may help determine the direction or focus of the interview. An *unstructured format* means that the researcher has a general idea of areas to be covered, but the questions are not yet determined. With this format, the participants also help determine the focus, scope, and direction of the interview.

Observations

Observations may take the form of "outsider" observations, where the researcher records behavioral observations and does not participate in the events. This method is often referred to as *naturalistic observation*. Examples are a researcher recording college student behavior on the first spring day on the campus quad or studying children's peer interactions behind a one-way mirror at a child care center.

With other observational methods, the researcher participates in at least some aspect of what is studied. This method is typically called *ethnography*. Minimally, the participation takes the form of being in the setting and obviously taking notes. This method is typically considered *conventional ethnography*. For example, Anne Haas Dyson, author and professor of education at University of California, Berkeley, took notes in an elementary classroom and playground for 2 years, recording children's experiences related to literacy, culture, and peer relationships.

Another kind of ethnography is where the researcher participates in setting activities. This method is usually called *participant observation* or *participatory ethnography* (for examples, see books written by William Corsaro, a professor of sociology at Indiana University). An example is a researcher serving as an elementary school teacher while taking notes about those experiences. In either of these cases (i.e., conventional or participatory), the researcher might choose to write from a perspective that highlights what others are doing.

Another option is to write about how the researcher's experiences interact with the events in the setting; this is called *autoethnography*, and requires the researcher to examine his or her own role. For example, one could read books written by Ruth Behar, professor of anthropology at the University of Michigan. To parallel the aforementioned example, an autoethnographic account could be the researcher writing about how his or her own gender, race, and/or social class influenced interactions with students in the elementary school classroom. The goal might be to understand how culture mediates experiences.

Action Research

Action research is a value-based method that is grounded in social justice and designed to facilitate change in the research setting. Action research might or might not be qualitative and might or might not be participatory. In *participatory action research*, the researcher works with participants as collaborators in terms of defining the research question, determining how to study the question, and interpreting the results. An example is school staff and researchers interviewing students about playground behavior and, based on children's input, creating a playground intervention that promotes social justice. Action research, on the other hand, does not include the stakeholders in the design or methodological process of the research, but social justice drives the results and they are given back to the research setting.

Archival Research

Archival research, which encompasses historical research, involves gathering any data that trace the past and seek to understand behavior patterns over time. Archives include written documents such as diaries, clinical notes, and magazines, as well as unwritten physical documents such as examining the wear patterns on playgrounds. An example is looking at school yearbooks to determine if specific groups of students participate in specific types of activities or clubs.

QUALITATIVE DATA ANALYSIS

Just as there are several types of qualitative research, there are also several ways to analyze qualitative research. Some of the more common approaches include content analysis, interpretative phenomenological analysis, narrative analysis, discourse analysis, and grounded theory. The type of analysis done often is informed by the researcher's philosophy of science.

Content Analysis

Content analysis is done typically by identifying recurrent themes in the data (transcripts or field notes) that relate to the research question through a coding process. The research questions or areas are determined before data examination. Some researchers argue that the person who was in the research setting, especially if the research took place over a long period of time, need be the only person involved in analyzing the data because familiarity with the data (including the meaning) will be greater than for an outside person. Some argue that at least two people should code data in order to ensure agreement for conclusions drawn. Still others prefer to use computer software to analyze data. These differences in approach are based in philosophy of science (in terms of how we know things and what kinds of claims can be made).

Interpretive Phenomenological Analysis

Another type of analysis is *interpretive phenomenological*. The goal is usually to describe behavior, places, and the interaction between the two. Here, the researcher starts with everyday experiences and becomes reflective of those experiences. Data are gathered through field notes, transcripts, accounts, archives, etc. In the next step, the researcher attempts to interpret the experience reflected upon. What are the essential aspects of the experience and how are those aspects understood? These meanings and experiences are then linked to broader systems such as culture. In the final step, the researcher describes the findings. With this method, the specific research questions and literature review generally happen after some analysis has been completed so that the data drive the direction of the analysis.

Narrative Analysis

A *narrative analysis* assumes that the data collected are in story format (e.g., a life history, a story about school experience). The story is examined first in its entirety and then divided into smaller substories. Details of the substories are examined, looking for apparent themes or uniqueness among and within substories. Often, links are drawn between the story being told and larger community or dominant narratives. An account is then written, detailing the findings.

Discourse Analysis

A person who is interested in studying conversational patterns or language use might use *discourse analysis*. The first step is to transcribe the text, including all aspects of speech such as words, pauses, stuttering, voice pitch, and emphasis. All parts of speech are viewed as essential to understanding the meaning of the speech act. In the analysis phase, the researcher determines research questions or areas and then identifies instances that are consistent and inconsistent with the researcher's expectations. Patterns or themes are determined, and the analysis is written.

Grounded Theory

With *grounded theory,* the goal is to produce theory from data (rather than test data against a theory). With this analytic approach, data are analyzed and collected simultaneously, so that findings can shape the direction of further data collection. An analysis generally consists of a line-by-line coding of the data, identifying as many themes as possible. The next step is creation of more focused codes based on the line-by-line coding. From there, the researcher creates more general categories. A literature review is then conducted, and the results are written in manuscript form.

EVALUATION OF THE RESEARCH

With respect to judging scientific defensibility, there are several models. With most models, there are three general criteria to be met: believability, applicability, and agreement. *Believability* can be met through long-term engagement in the research setting, using multiple methods, and/or double-checking understanding with participants. *Applicability* is met if other readers have enough detail to understand how results may or may not apply to different settings or conditions. *Agreement* occurs when others agree that the analysis is consistent with the claims made.

SUMMARY

Qualitative methods provide additional ways to examine research questions. Use of qualitative methods allows a researcher to ask questions and provide evidence about research questions that focus on broad, dynamic, multifaceted phenomena.

—Regina Day Langhout

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QUANTITATIVE METHODS

Quantitative methods play a critical role in applying the scientific method to the study of human development. Our observations of behavior must be transformed into data, and our data must be described and used to test hypotheses. Quantitative methods play a role in both of these endeavors, which fall under the general headings of *measurement* and *statistical analysis*.

Formally, *measurement* is defined as the assignment of numbers to represent properties of objects in a lawful way. In recent years, measurement theorists have stressed that measurement is not a simple, mechanical process; rather, measurement involves the application of theory to a behavioral realm. For example, one's theory about intelligence will guide how many numbers are assigned to represent it. A unitary conception of intelligence argues for a single set of numbers being sufficient (e.g., IQ scores), whereas a multidimensional conception argues that several sets of numbers are required to represent intelligence adequately. Good measurement involves, then, not just attention to vital concepts such as reliability and validity but also an understanding of what model underlies the numbers being used to stand in for behavior and how best to test the assumptions of that model. Of course, there are many unique difficulties associated with obtaining good measures of young children that are not encountered when measuring adults.

Even a brief discussion of measurement necessitates mention of Stevens' classic *scale types*, the hierarchy of nominal, ordinal, interval, and ratio scales. Stevens argued, essentially, that if one knew the scale type being used in one's study, then one knew how to interpret the numbers and what statistical analyses were permissible. Stevens' scale type theory was extraordinarily influential in the last half of the 20th century, but many have argued that it is incomplete and does not provide a framework for evaluating the adequacy of our measures. The process of measurement is now more closely aligned with theory testing as, for example, in complicated multitrait, multimethod validity studies.

Statistics can be used to describe data (e.g., providing a scatterplot of intelligence plotted against achievement motivation, or giving a mean and standard deviation for a set of attitude scores) or to test hypotheses about the populations from which samples are drawn (e.g., do children differ in their attachment styles to mothers versus fathers). Some statistical procedures are unique to developmental or "over time" data, and, more generally, the rapid growth of computing power since the 1960s has meant a huge increase in the arsenal of statistical techniques available to researchers, especially those with large numbers of variables and large numbers of participants. Indeed, new professional organizations have sprung up, new journals have been initiated, and new methodological standards have been applied in the submissions of research applications and journal articles. For example, researchers are required to pay more attention to statistical power (the ability to detect real differences in populations) and to effect sizes (the actual magnitude of any statistically significant results). A new technique called *meta-analysis* is designed to evaluate the size of effects across several different studies of the same behaviors.

Sophisticated statistics remains a poor substitute for creative but logical research designs, however. Especially in developmental studies, researchers must work diligently to employ methodologies with appropriate control groups, with representative samples, and with ecological validity (as Bronfenbrenner defined it, namely, the extent to which the study's participants are experiencing the study the way the researcher intended). Quantitative methods are part and parcel of, and can help improve, every stage of the research process—from designing a new measure to testing whether children's standing on the measure changes over time. Indeed, the scientific study of human development rests on the foundation of quantitative methods.

—James A. Green

See also Longitudinal Research, Reliability, Validity

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QUASI-EXPERIMENTAL DESIGN

In the early 1960s, Donald T. Campbell pioneered the method of quasi-experimentation. A quasi-experiment is a way of methodically gathering data about a topic in its natural environment when that topic cannot be studied in a laboratory. The word "quasi" is derived from the Latin *quam si*, and means "as if," "in some sense or degree," or "resembling in some degree." An experiment is an operation carried out under controlled conditions in order to discover an unknown, to test or establish a hypothesis, or to illustrate a known law. By these definitions, a quasi-experiment approximates the controlled conditions of an experiment to discover an unknown.

An important goal of experimental research is internal validity, or the ability to conclude a causal relationship between the independent and dependent variables. To conclude causality, the only difference between groups should be the independent variable or variables in question. This is achieved by directly manipulating and controlling the levels of the independent variable and by randomly assigning participants to the levels of the independent variable. When the criteria for causality cannot be met, the experiment is considered a quasi-experiment. Thus, causal conclusions cannot strictly be drawn from a quasi-experimental design.

The lack of control in a quasi-experiment can be compensated for in a number of ways. First, large numbers of participants are often recruited in quasi-experimental designs in an attempt to minimize the differences among the groups. In addition, methodological techniques such as matching are used to achieve approximately equivalent groups. Even though these techniques improve the possibility of a causal connection, causality cannot be established through a quasi-experiment.

Regardless of the potential problems, quasi-experiments have a secure place in modern research. Why use a quasi-experimental design? One reason is that it may be impossible to conduct a true experiment. Quasi-experiments are frequently used to study phenomena such as riots or traffic incidents where it is unethical, unlawful, or otherwise unavailable to assign participants into different experimental or control groups. Additionally, a quasi-experiment may be elected because the experimenter wants to maintain external validity or the extent to which the findings can be generalized to other individuals or situations.

Investigating the effect of punishing retailers who sell alcohol to minors is an example of a quasi-experiment. Retailers who have received citations for not checking identification could be compared to retailers who have never been cited. Because participants cannot be randomly assigned to experimental conditions, there are other potential explanations for the results, and causality cannot be inferred. Therefore, this is a quasi-experiment rather than a "true" experiment.

There are different varieties of quasi-experimental designs, including the nonequivalent groups design, interrupted time series design, and proxy pretest design. These differ in the way the procedure is set up and how measurements are taken.

To summarize, a quasi-experimental design is one that approximates a true experiment when a true experiment is not possible or the researcher is concerned with maintaining external validity. The advantages of a quasi-experimental design are the ability to conduct the experiment in a natural setting and a potential increase in external validity. The subsequent disadvantage is that internal validity is compromised and causality cannot be inferred from a quasi-experimental design.

—Danielle Mull and Shannon Whitten

See also Experimental Method

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QUINCEAÑERA

La quinceañera is a Latina tradition involving a coming-of-age celebration for young women on their 15th birthdays. The word *quinceañera* comes from the words "quince," which is Spanish for *15*, and "años," which is Spanish for *years*. Although the exact origin of the celebration is unknown, the tradition is thought to have Aztec and Catholic roots. Several centuries ago, girls were separated from other children when they turned 15 in order to prepare for womanhood and learn about their future roles within their families and community.

Today, the event includes a thanksgiving Mass, which represents a young woman's vow to serve her community, church, and family, and the event also includes an extravagant party to celebrate the special occasion. Planning for the quinceañera celebration is elaborate. Much like for a wedding, for her quinceañera the 15-year-old and her family send invitations, buy a formal full-length gown, reserve a reception hall or a party salon, order a cake, and hire photographers and possibly even choreographers. Also, just as a bride and groom pick bridesmaids and groomsmen, the young woman chooses 14 people to be the "chambelanes" (chamberlains) and "damas" (maids of honor) of her court. These 14 court members represent each year of the Quinceañera's life prior to her 15th birthday.

The most important part of a quinceañera is the religious Mass, which occurs at the beginning of the celebration. This ceremony recognizes religious customs and the virtues of family and social responsibility. At this time, the birthday girl thanks God for her blessings and asks for guidance and protection as she begins her new stage of life. She welcomes her role as a woman and defines her goals for the future. Parents and godparents may give a speech at the altar as well.

After Mass, relatives and friends gather for the social part of the evening. Traditionally, the Quinceañera dances her first dance with her father. She changes from flats into high-heeled shoes for this dance to symbolize her entrance into womanhood. She also reserves a dance, typically a choreographed waltz, for one or more of her chambelanes. For the rest of the celebration, family and friends are welcome to dance to the music of the band, which is often a mariachi band. Other highlights of the occasion include the cutting of the cake and a celebratory toast.

On her birthday, the Quinceañera also receives gifts that hold special meaning and indicate her loyalty and commitment to God, family, and community. Traditional quinceañera gifts may include a tiara to symbolize triumph over childhood; a bracelet or ring to denote the unending circle of life; earrings to remind the young woman to always hear and respond to the world around her; a cross to represent the Quinceañera's faith in God, her world, and herself; and a bible to keep close the word of God. The Quinceañera might also receive a personalized pillow to place under her knees as she kneels during the Mass or a Quinceañera doll that serves as a keepsake for the event. To show appreciation toward her guests, the birthday woman of honor, with the help of sisters, cousins, and friends, often gives commemorative favors to those in attendance.

The quinceañera rite of passage began long ago, but the ceremony is still observed in several countries, including the United States. Although some Latina 15-year-olds may prefer to receive a trip or even a car to celebrate, the beginning of a woman's 15th year of life still marks a significant and symbolic life change. Today, the quinceañera remains one of the traditions that affirm the bond of Latinas worldwide.

—Kristin L. Rasmussen

See also Adolescence

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R

Reading

Books are the quietest and most constant of friends; they are the most accessible and wisest of counselors, and the most patient of teachers.

—Charles W. Eliot

RAPE

The term *rape* has different meanings for different segments of the population. For example, within the field of psychology, the terms rape and sexual assault are often used interchangeably and encompass a range of nonconsensual acts from touching the breasts, buttocks, or genitals, to forced penetration of the vagina, anus, or mouth, by a penis or an object. In this case, force can involve verbal coercion, threats, physical restraint, or violence. Although laws vary by state, the generally accepted legal definition of rape is an act of sexual intercourse carried out by force or coercion, or when the victim is unable to give consent.

While many people think that stranger rape, the man hiding in the bushes wearing a ski mask, is more common, research indicates that date or acquaintance rape is much more prevalent. Statistics show that about 85% of sexual assaults are committed by someone whom the victim knows, and 57% of assaults are perpetrated by romantic partners. Because of the stigma associated with admitting to having been raped and differing definitions of rape, it is difficult to know what the true incidence and prevalence statistics are for rape. However, across the life span and regardless of age or socioeconomic status, studies consistently demonstrate that prevalence rates for rape are between 15% and 25%. In terms of the age of rape victims, the youngest rape victim ever reported was 2 months old, while the oldest was 97 years old.

Thus far rape has been discussed as it relates to women, yet it is important to realize that men can be victims of rape as well. Typically, men are victimized by other men. Research indicates that while male rape make up about 5% of all reported rapes, 95% of male rape victims do not report the assault. The FBI estimates that 1 in 10 men are the victims of adult sexual assault.

Part of the reason that rape is an underreported crime and one that is viewed with a great deal of skepticism is the presence of rape myths. Rape myths are generally defined as false beliefs about various aspects of rape that inadvertently support the presence of rape within society by denying the prevalence, impact, and severity of the crime. Rape myths essentially call into question the guilt of the perpetrator and the innocence of the victim by focusing attention on irrelevant factors such as the victim's dress or behavior or by implying that certain circumstances justify rape. According to one commonly known rape myth, women often falsely accuse men of rape. In reality, the rate of false reporting of rape

is less than 1%, while the false report rate for all other crimes is estimated to be around 3%.

The psychological sequelae of rape are numerous. Research shows that rape produces both initial effects as well as long-term impact on victims. Short-term sequelae of rape include physical and emotional injuries, contracting sexually transmitted diseases, unwanted pregnancy, feelings of guilt, betrayal, responsibility, shame, inadequacy, inability to trust, fear of men, fear of being alone, insomnia, problems concentrating, nightmares, and an increased susceptibility to stress-related illnesses. Long-term effects of rape include depression, drug and alcohol abuse, suicidal ideation, low self-esteem, sexual dysfunction, relationship problems, and posttraumatic stress disorder (PTSD). The most common psychiatric diagnosis given to rape victims postassault is PTSD. The symptoms of PTSD include nightmares, flashbacks, and intrusive images of the assault, feelings of emotional numbness, irritability, anxiety, avoidance of all trauma cues, hypervigilance, difficulty concentrating, and insomnia. Studies indicate that 94% of rape victims meet the criteria for PTSD between 1 and 3 weeks post-assault. While some rape victims can recover either spontaneously or with treatment, others can suffer from symptoms of PTSD for decades after the assault.

—Judith Conoyer Bronson

See also Violence

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READING

In a split second, a skilled reader identifies words, recovers their meanings, and integrates them with prior words in the passage. The average skilled reader recognizes at least 50,000 words, having read about a hundred million words. Though reading seems automatic, it is a complex cognitive act consisting of several component operations that deal with the sequence of words, phrases, and sentences of a text. These operations act together to achieve the result of reading, which is the comprehension of the text. Reading involves other cognitive processes, including perception, memory, reasoning, and problem solving. Unlike spoken language comprehension, the reading skill requires a long period of instruction and practice. However, the rewards are ample as our society values literacy as a prerequisite for success.

COGNITIVE PROCESSES IN READING

Coherent text is based on the repetition of key concepts in a text. In order to comprehend the text, readers must spot the recurring ideas in the text and integrate them into a mental structure. Because most texts are too long to be processed in one piece, the reader creates a memory representation by processing the text's smaller units, its sentences, and its clauses. A variety of processes at several levels of structure, including letters, words, phrases, and sentences, contribute to comprehension. At the letter level, visual features must be decoded to identify letters. Word-level processes include the encoding of the word into an abstract unit and lexical access by which the word's meaning is retrieved from a mental lexicon. Sentence-level processes include operations that handle both the segments of the sentence and the sentence as a whole. Text-level processes integrate the information from different sentences into the reader's model of the text. To achieve such integration, the reader must maintain the prior information from the current text in memory. All along, inferential processes occur that make use of the reader's general knowledge of the physical and social world.

How does the reader integrate text information with prior knowledge, whether it is from the current text or from other sources? Different models of reading comprehension attempt to find an answer to this question. Memory-based models assume that information

in memory is activated automatically during reading. This is a continuous process that requires relatively little mental work. The text concepts currently in focus broadcast a signal to the contents of memory. Concepts in memory are activated by virtue of passive resonance. The degree of activation of a concept in memory depends on its similarity to the specific text concept.

Constructionist models view reading comprehension as an active building of the text representation. The representation captures the causal relations among events in the text. The events include the goals, reactions, and actions of a story's character as advocated by story grammar theory. Situation models focus on what the text is about rather than the repetition of individual concepts. In addition to causal relations, the scenario of a text includes the spatial and temporal context within which the story evolves.

READING RESEARCH

There are four largely independent traditions in reading research. These include research on (1) basic cognitive processes in reading, (2) the precursors of reading, (3) reading instruction, and (4) reading disabilities with special emphasis on dyslexia. Basic researchers and dyslexia researchers increasingly turn to neuroimaging methodologies to complement behavioral assessments of reading.

Basic Research

Basic reading research examines the behavioral and neural manifestations of reading comprehension. The research uses patterns of eye fixations and other behavioral measures, as well as neural images, to track the changing mental load as a person reads a text. Eye fixation studies reveal that reading does not involve the smooth movement of the eyes across the page that one might assume. Rather, the eyes make short and rapid movements, known as the saccades, and then fixate on a text unit, which is typically a word. It is during the fixation that the reader is assumed to extract the meaning of the word. Thus, reading is much like a slide show where words are flashed for about a quarter of a second. The reader controls the exposure duration of each word, albeit unconsciously. The duration of eye fixations reflects the difficulty of a text segment. Unfamiliar words, challenging syntactic structures, and concepts introduced for the first time in a text require longer fixation durations. In addition, both behavioral and brain imaging research have shown that reading involves shifts of activation to currently relevant meanings and active suppression of meanings no longer relevant.

Brain imaging research supports the hypothesis that reading builds on spoken language processing in that reading makes use of the same brain regions implicated in understanding spoken language. In normal readers, these typically are centers in the left hemisphere, the rear-brain parietal region, including Broca's area, and the boundary region between the temporal and occipital lobes. The latter region is presumably implicated in word decoding. Integrating information across clauses and sentences activates centers in the right frontal lobes.

The Precursors of Reading

There is a profound difference between learning to speak and learning to read. Speaking is innate, but reading is not. Children must be instructed to learn to read. Spoken language has existed for at least 50,000 years. The human brain has evolved to produce and comprehend spoken language. Reading is of a more recent vintage, perhaps no older than 5,000 years. Learning to read presumably capitalizes on the brain systems used for spoken language processing.

There is consensus among researchers that phonological awareness is a critical precursor to reading and that it plays a fundamental role in reading acquisition. Phonological awareness refers to our sensitivity to the sounds in words, the phonemes, and our ability to manipulate those phonemes. Phonemes are the smallest sound units in language. Phonological awareness is tested, for example, by asking the person to say *crane* without the *r* or *cat* without the *c*. There are three aspects of phonological awareness: phonological sensitivity, phonological access to the mental lexicon, and phonological memory.

Phonological sensitivity is reflected in the child's ability to identify words that rhyme, to combine phonemes into words, and to delete syllables or phonemes from a word to create another word. Such sensitivity advances the child's understanding of the correspondence between letters and phonemes, which is the basis of alphabetic languages.

Phonological memory involves short-term memory for sound-based information. This is measured by span tests where the child must repeat a sequence of items in the order they were presented. Phonological memory enables a child to maintain a representation of the phonemes corresponding to the letters of a word, as the

child processes the text's clauses, sentences, and relations between repeated concepts. Not surprisingly, phonological awareness accounts for much of the difference between poor and good readers. Most children have no trouble manipulating phonemes, but for poorer readers this is a difficult challenge.

Reading Instruction

Throughout the last century, there has been a vocal debate on the best method of reading instruction involving advocates of the whole-word method and the phonics method. Proponents of the whole-word method believe it is best to teach children to read by exposing them to whole words and by reading entire stories. This method works adequately for children who can break the decoding barrier on their own, but not for those who cannot.

The phonics method is more attuned to phonological awareness as a precursor to reading. Recent research evidence from a diverse set of sources has demonstrated that this is more successful for most children than the whole-word method. According to the phonics method, children are instructed to form mental links between letters and sounds, and between sounds and words. Specifically, as noted in the National Reading Panel report (2000) "explicit, systematic instruction in phonemic awareness is more successful in teaching children to read than any other method."

Research on Dyslexia

Whereas the reading level of poor readers is on par with their general intelligence, dyslexic readers read at a level significantly below their level of intelligence. Dyslexia is defined as a learning disability that is neurobiological in origin. Dyslexic individuals have difficulty with fluent word recognition thought to result from a deficit in the phonological component of language. Dyslexic children typically have problems in identifying specific target words visually, even when given unlimited time. As a result, these children encounter problems in understanding passages of text. They tend to read less, thus impeding the growth of their vocabulary and general world knowledge. It is estimated that about 5% of all school-age children, or approximately 2.5 million, are dyslexic.

Brain imaging research reveals a contrast in the brain processes of normal and dyslexic children during reading. In dyslexic readers, including the youngest ones, brain centers other than those in normal readers are activated during reading. Notably, the occipital-temporal word decoding area is not active. Importantly, when performing other cognitive tasks such as problem solving, the brain activation patterns of normals and dyslexics do not differ. When systematic remedial tutoring in phonics and phonological awareness is started early enough with young dyslexic children, their reading skills improve significantly. Indeed, their brains prove to be malleable to such instruction and their brain patterns come to resemble the brain patterns in unimpaired children.

SUMMARY

Much progress has been made in the last decade on basic, instructional, and remedial issues in reading. Nevertheless, as Edmund Huey, the pioneer of reading research, noted nearly a century ago, "to completely understand the mental processes of reading represents the acme of reading research."

—Karl Haberlandt

See also School

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RECIPROCAL DETERMINISM

Reciprocal determinism refers to mutual back and forth interactions among individuals, objects, or

processes. In a recent application, the *principle of Reciprocal Determinism* asserts that there are mutual back-and-forth influences among levels of organization and function in neurobehavioral systems. According to the 19th century neurologist, John Hughlings Jackson, the evolution of the nervous system entails a progressive layering of more newly developed neural systems over lower and more primitive organizations. This progressive layering yields what Jackson termed the re-representation of functions at multiple levels within the neuraxis.

Lower-level systems tend to be relatively simple, limited in scope and function, and inflexible compared to higher systems. The pain withdrawal reflex to a noxious stimulus, for example, is organized at the spinal cord level and comprises a rather simple circuit consisting of a pain afferent (sensory input neuron), a motor efferent (motor neuron to the muscle), and a few interconnecting interneurons within the cord. This provides for a very rapid efficient limb withdrawal response that can occur prior to conscious awareness of the pain. More complex reactions, consisting of escape, defensive reactions, or aggressive reactions, are organized at higher levels of the neuraxis. These higher systems allow for more complex patterns of response to pain. One structure that has received a great deal of attention in this regard is the amygdala, an almond-shaped set of nuclei within the temporal lobe. The amygdala has been shown to be especially important in learned fear responses and in mediating the behavioral effects of emotional reactions.

At the highest level of processing within the cerebral cortex are organized the most general, integrative, and flexible cognitive substrates that support a variety of highly adaptable and flexible *strategies* for avoiding or eliminating aversive conditions. These include efforts such as planning of avoidance strategies, procurement of shelter to escape the cold, and social cooperation to enhance defensiveness (establishment of laws, police forces, armies, etc.). These higher-level systems do not replace lower mechanisms, but provide for the elaboration and further development of adaptive responses. The multiple levels of re-representation can be active concurrently. A pain stimulus may trigger a pain withdrawal reflex as well as a cognitive avoidance strategy. Lower-level systems can bias higher-level processes, and higher-level processes can impact lower-level systems. This is reciprocal determinism.

From the broadest vantage, the principle of reciprocal determinism captures the fact that a given level of organization and function (e.g., the psychological domain) is both impacted by and impacts on other levels of organization and function (e.g., the physiological domain). Interactions are two-way (reciprocal) and mutually influence functions of the other level (i.e., they are determinants). Consequently, a comprehensive understanding of behavior may require attention to both its psychological and biological determinants. This has become evident in the past quarter century of research on addictive behaviors. Drug abuse is fundamentally related to the actions of drugs on brain receptors, so an understanding of addiction will necessarily require attention to the psychopharmacology of drugs. However, drug exposure alone does not necessarily lead to addiction. Psychological states and environmental and sociocultural influences as well as life history can all powerfully influence an individual's reactions to drugs. Moreover, drug taking can alter psychological states and so on go the reciprocal influences underlying drug abuse. Drug abuse is an example of a reciprocally determined phenomenon—the direction of causation between behavioral and physiological processes is not one way.

The principle of reciprocal determinism has a guiding corollary concerning interdisciplinary science and the multiple levels of analysis that can range from the psychological to the organ (brain) level to the cellular to the genetic and ultimately to the molecular level. Because causal influences among processes studied at different levels of organization can be bidirectional, the *Corollary of Interdependence* states that a single level of analysis may not yield a comprehensive understanding of a phenomenon, and that there may be no single, preferred level of analysis that uniformly applies. In this regard, the principle of reciprocal determinism is most consistent with an interdisciplinary, multilevel scientific approach.

—Gary G. Berntson and John T. Cacioppo

See also Bandura, Albert

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REFLEXES

The meaning of the term "reflex" has changed considerably as theories of motor control have evolved. Classically defined as an involuntary and relatively stereotyped response to a particular stimulus, a reflex was considered to be the simplest component of the nervous system able to produce a coherent, elemental reaction. To qualify as a reflex, a response had to be perfectly reproducible, be graded with respect to stimulus intensity, and occur at a specific time after the stimulus. However, over time the term has been applied loosely to a wide range of motor behaviors, ranging from the relatively simple knee jerk in response to a patellar tendon tap to the complex patterns of neuromuscular interactions required to maintain equilibrium. Though reflexes have historically figured prominently in theories of motor control, motor learning, and motor development, contemporary researchers cannot agree on what constitutes a reflex and whether the term even has scientific value, despite the popularity of the term's usage in the scientific literature, clinical settings, and lay conversations.

The Latin translation of the term reflex is "bending back." Descartes referred to reflex systems as neural pathways connecting stimulus with response; however, Georgiy Procháska is credited with first formally defining a reflex as a behavior in response to an excitation, mediated by separate motor and sensory nerves. A number of studies in the 18th, 19th, and 20th centuries showed that a vertebrate spinal cord that was disconnected from the brain was capable of automatically producing movements when externally stimulated. These findings led to the notion that reflexive behaviors were distinct from voluntary behaviors because they were externally triggered, automatically controlled, and highly repeatable. Subsequently, all of these characteristics of reflexes have been called into question. For example, many reflexive behaviors are thought to be internally elicited and even the parameters (e.g., gains) of the simplest reflex circuits can be modified by instructions and other task and contextual factors. Furthermore, these modifications can themselves be learned and unlearned.

Many contemporary researchers now believe that all behavior lies on a continuum from reflexive to voluntary with no specific behaviors being either purely reflexive or purely voluntary. Those who consider the term reflex to be scientifically useful are divided as to whether to differentiate reflexive and voluntary behavior based on the potential for conscious mediation or based on the anatomical/physiological complexity of the circuits (with only the simplest input-output circuits being considered reflexive) involved in behavior. Many researchers would prefer to replace the term reflex with sensorimotor interactions. Others have suggested using terms such as reactions, coordinative structures, and functional synergies, though these terms have typically referred to the more generalized responses to stimuli.

Despite the debate over the usefulness of the term, reflexes have generally been classified according to their function. The most basic reflex circuit is composed of four units: a receptor, an afferent (sensory) neuron projecting to the central nervous system, an efferent (motor) neuron to the muscle, and an effector (e.g., a muscle). Interneurons are not essential but it is rare to find a reflex circuit without one. Reflexes are considered monosynaptic, disynaptic, or polysynaptic depending on whether they have one, two, or more central synapses. The latency of a response is determined by the speed of transmission over the nerve fibers (conduction is faster across larger diameter fibers), the time to cross synapses, the number of synapses, and the time for the muscle to contract. Repeated application of a constant innocuous stimulus leads to an attenuation of a reflex that is referred to as *habituation*. Any detectable change to the stimulus leads to *dishabituation*, where the reflex returns to its baseline state. Repeated application of a noxious stimulus can lead to an enhancement of the reflex referred to as *sensitization*. In some reflexes, it is possible to elicit the response to a novel stimulus if that stimulus is paired in time with the stimulus that typically elicits the response. This type of associative learning creates what are known as *conditioned reflexes*.

The *muscle spindle reflexes* (also referred to as *myotatic* or *stretch reflexes*) are the simplest reactions that have been labeled reflexive. The stretch reflex, which causes a muscle to contract when the muscle or its tendon are tapped or a load is suddenly applied to

a limb, is designed to preserve a prespecified muscle length. The receptor is a muscle spindle which lies in parallel with the *extrafusal* muscle fibers. The spindles have their own *intrafusal* muscle fibers that contract when the main muscle fibers contract so that the central region of the spindle stays taut and can respond to any muscle stretch. Afferent fibers project from the spindle to the spinal cord where they synapse with motor neurons that activate fibers of the muscle in which the spindle is located. The stretch reflex has a phasic component that rapidly responds to the rate of muscle stretch and a sustained tonic component that responds to the amplitude of stretch. Stretch reflexes must be overridden to accomplish voluntary movements, and this is achieved by activating the extrafusal and intrafusal muscle fibers at the same time. The spindle reflexes help to regulate muscle stiffness and they are particularly important for damping oscillations at the end of movements and for controlling mechanical interactions among limbs and between the limbs and the environment.

Among the most complex and generalized reactions that have been referred to as reflexive are the postural reflexes. In contrast to the spindle reflexes, which are localized at the level of the spinal cord and respond to mechanical stretch (or electrical stimulation of their afferent fibers, in which case they are called *Hoffman reflexes*), the postural reflexes are organized by the brain stem in response to vestibular, somatosensory, and visual inputs. The *vestibular* (*labyrinthine*) *reflexes*, the *neck reflexes*, and the *righting reflexes* are well-known postural reflexes. *Vestibulocollic* and *vestibulospinal reflexes* are labyrinthine reflexes that stabilize head orientation in space. The former activate neck muscles to keep the head upright, whereas the latter act on limb muscles, causing flexion or extension depending on head position. The *cervicocollic* and *cervicospinal reflexes* (often referred to as *tonic neck* reflexes) are neck reflexes that respond to flexion, extension, and rotation of the head about the neck. The former activate neck muscles and the latter activate limb muscles. Cervicocollic and vestibulocollic reflexes generally complement each other, while cervicospinal and vestibulospinal reflexes can work at cross purposes, in which case one is thought to dominate the other. The righting reflexes are those reactions that help reorient the head and/or body to an external frame of reference such as gravity or the surface of support, or that help to reorient body parts (e.g., head and trunk) relative to each other. They include vestibular and neck righting reflexes, *optical righting reflexes*, and *body righting reflexes*, the latter responding to cutaneous stimuli.

The isolated components of the postural reflexes are difficult to discern in normal motor behavior because the substrates of voluntary movements are typically so highly integrated. However, they often become apparent in stressful activity or during maximal efforts, presumably because they are recruited to reinforce muscle contraction and extend endurance. The postural reflexes are often seen in exaggerated form in brain damaged patients and can be elicited in early infancy. In both cases, lack of inhibition from higher brain centers is thought to account for the ease with which the reflexes can be elicited.

From a developmental perspective, the role of reflexes is hotly debated. Primitive reflexes (labeled primitive because they were first seen in animals more primitive than humans and because they reside at lower levels of the CNS) can be elicited as early as the second or third month after conception, and most of the estimated 27 major infant reflexes are present at or prior to birth but have disappeared by 6 months of age in typically developing children. Infant reflexes are thought to have several functions: they facilitate survival (e.g., the *sucking reflex*), they provide protection (e.g., the *moro reflex* in which all limbs fling outward in response to a sudden displacement of the head and trunk); they stimulate the CNS and muscles and regulate muscle tone, and they permit early exploration of the environment and of the body. In addition, reflexes provide pediatricians with a useful tool for evaluating neurological integrity because the onset and disappearance of most reflexes is fairly well documented. However, there is controversy concerning the link between early reflexes and later voluntary behavior.

Most viewpoints generally agree that early reflexes are integrated into voluntary movements (though we must be mindful of the controversy surrounding the terms “reflex” and “voluntary”). After all, early reflexes appear to be ideally suited to serve as prefabricated building blocks for more complex behaviors. The controversy surrounds the continuity between early and later appearing behaviors. The traditional view is that those reflexes resembling later behaviors must be suppressed by higher brain centers before they can reappear as voluntary behaviors. A related view is that primitive reflexes must disappear and postural and locomotor reflexes must appear before

voluntary behavior is possible. A more contemporary view is that early reflexes are rudimentary expressions of later behaviors (i.e., there is continuity across development). Proponents of this viewpoint prefer not to use the term reflex to describe these early patterns because they do not conform to the classic definition of involuntary and relatively stereotyped responses to particular stimuli. Evidence shows that many precocious patterns are not stereotyped in their expression, that they can be modified by task and contextual factors (including reinforcement and infant level of arousal), and that they can be facilitated with training or practice. For example, practice of the *stepping reflex* causes the pattern to persist across the first year of life and is associated with an earlier onset of independent walking. These findings, coupled with newer findings, will continue to contribute to the evolution of our ideas about reflexes in human behavior.

—David I. Anderson, Marianne Barbu Roth, and Joseph J. Campos

See also Babinski Reflex, Breathing Reflex, Sucking Behaviors

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REGGIO EMILIA CHILDHOOD PROGRAM

In the early 1990s, American early childhood educators began to explore a new philosophy of schooling described by Loris Malaguzzi as a system of relationships. That system is now commonly known as the Reggio Emilia Approach (REA). The system calls for an organization—school/classroom—working closely together to offer the best learning experiences for young children using a variety of media referred to as the "100 Languages of Children." Those languages become the mechanism for children's learning experiences. In addition, the languages foster relationships among children, educators, and families within the greater social context. Teachers, children, and families discuss learning experiences with one another and plan using multiple perspectives.

Curricula are supported by a coordinator referred to as a *pedigogista.* The *pedigogista* is responsible for coordinating the school's curriculum and may work with multiple schools. All Reggio classrooms believe in the richness of fine arts as well. Through the incorporation of an art studio (*atelier*) within the schools, the *atelierista* provides support for the arts. The *atelierista* is usually assigned to only one school and works with multiple classrooms. The *pedigogista*, the *atelierista*, the teachers, and the children all work together on projects.

Although Reggio Emilia is actually a city in Italy, the approach to early childhood education has become world renowned for recognizing the "image of the child." In the Reggio Emilia Approach, children are protagonists of their learning and are competent and capable. Project work, the backbone of the learning experience, encourages children to use their "100 languages" to explore, discover, construct, communicate, and interact in the learning environment. Project work is defined as *progettazione.* American educators have used project work for many years. What distinguishes Reggio Emilia from other approaches is twofold: (a) the notion of emergent curricula that is more complex in planning, and (b) the dynamic process of *documentation* of children's thinking and learning processes. Malaguzzi described children's projects as "long stories."

Documentation serves as a method to demonstrate children's thinking and learning processes. It also is a system of organizing children's work over the life of a project and the development of the child. Within the organization of the project, teachers capture children's actual words through dictation and apply the words directly to the works. Teachers, children, and families "revisit" the work of the children as another system of relating the teaching and learning process among and between all individuals.

This model preschool program supports the notion of quality education for young children. The basic tenets of the approach provide a framework for developmentally appropriate practices and rich meaningful learning experiences for children. When young children are provided learning opportunities through a variety of experiences that include teachers, children, and families, optimal growth and development is enhanced. The Reggio Emilia Approach to early childhood education is a philosophy that outlines such learning opportunities and experiences.

The preschools of Reggio Emilia, Italy, using the approach have deep roots dating back to the mid-1940s. However, many educators did not begin to fully appreciate the philosophy until the mid-1970s. Throughout the 1980s and 1990s, educators from around the world traveled to Italy to study this approach. Today, many writers and researchers continue to study and interpret this ever-evolving approach to early childhood education. As you consider the study of early childhood education and its complexities, the following serves as guiding principles for the Reggio Emilia Approach:

The child as protagonist, collaborator, and communicator.

The teacher as a partner, a guide, as a nurturer, and a researcher.

The parent as a partner too.

The environment becomes a third teacher.

Documentation is a form of communication.

—Elizabeth M. Elliott

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REGGIO-L discussion list, http://ecap.crc.uiuc.edu/listserv/reggio-l.html

REINFORCEMENT

Reinforcement is a process that results in a particular response, or set of responses, occurring more often in similar settings because a particular stimulus was presented or removed following that response. Reinforcement is always defined by its effect. That is, reinforcement always strengthens behavior, or produces an increase in the likelihood of that response in similar future settings.

POSITIVE AND NEGATIVE REINFORCEMENT

Positive reinforcement refers to the addition of a stimulus following a behavior that produces an increase in the future likelihood of that behavior or similar behaviors in similar settings. Negative reinforcement also always produces an increase in the probability of a response, but does so by removing, or subtracting, a stimulus that is aversive following a behavior. Negative reinforcement is often confused with punishment, which actually produces a decrease in responding.

Reinforcement can be intentionally arranged to increase certain behaviors, or it may be produced by naturally occurring environmental relations. When reinforcement is provided to establish a skill, it is called *programmed reinforcement*. Typically, reinforcement is contingent on, or dependent on, the occurrence of a particular response. When a reinforcer is provided at a specified interval regardless of the response that preceded it, it is referred to as *noncontingent reinforcement*.

REINFORCERS

The stimulus that produces the increase in the strength of responding characteristics of reinforcement is called a reinforcer. Reinforcers can include a wide array of stimuli, or of persons, objects, or events in the environment that effect behavior. Responses are present at birth to some stimuli that allow them to function as unconditioned reinforcers, or stimulus conditions that we favor instinctively. For example, infants typically respond to the human voice as an unconditioned reinforcer. However, individuals learn to respond to other stimuli through experiences that occur during their lifetime. The stimuli that we learn

to respond to are called *conditioned*, and can also function as reinforcers. Praise or kind words are examples of stimuli that individuals learn to respond to as a conditioned reinforcer. A young child will respond to a soft tone, but with experience they come to discriminate what the words of praise mean. All stimulus effects are individual in that each learner will respond in unique ways, and that the same learner may even respond differently to a given stimulus at different times.

Some reinforcers occur naturally in the environment and some are intentionally arranged, or programmed, to teach a given skill. Stimuli that function as reinforcers can be categorized as tangible, possessions, edible, activity, social, or manipulative. Tangible reinforcers might include items such as a toy, ball, or action figure. A possessional reinforcer could be the learner's favorite stuffed animal or pillow to which they are given limited access contingent on the performance of a particular behavior. Edible or consumable reinforcers include favored foods and drinks. It is important to note that when edible reinforcers are utilized, the learner cannot be satiated on them prior to attempting their use as a reinforcer. However, the learner must not be denied proper and appropriate access to consumable items outside the teaching environment. Thus, the use of edible items as reinforcers requires special considerations. An activity reinforcer might include a video game, time on a playground, or a trip to a favorite restaurant. Social reinforcers include access to or activities with desired people. This may include time alone with the child's mother, a trip to see a playmate, time with grandpa, or undivided teacher attention. Finally, manipulative reinforcers might include sensory toys or stimulation such as playing in a sand tray, building a Lego structure, piecing together a model, or other fine motor activities. It is possible for a single stimulus to be described by a number of labels, such as a programmed unconditioned positive tangible reinforcer or a soft, fuzzy blanket.

Knowing the types of stimuli that the learner responds best to is important to the arrangement of effective consequences for behavior. One might conduct a stimulus preference assessment to determine the relative value of an array of favored items for that individual. Our preferences change, even in the moment, so knowing what a learner prefers during one session might not help us to predict what they will respond strongly to in later sessions. If one has had extensive contact with an item, it might become less desirable for a period of time. This is called *satiation*. Conversely, when an item has been unavailable for a period of time, it may become more interesting due to deprivation. Satiation and deprivation momentarily change the power of stimuli to influence behavior. These two effects are called *establishing* or *motivating operations*.

SCHEDULES OF REINFORCEMENT

In both natural and programmed learning environments, a reinforcer can be provided on a variety of schedules. When establishing new behaviors, continuous reinforcement is the most efficient method. With continuous reinforcement, each behavior is followed by a reinforcer. However, once behavior has been established and shows some consistency, reinforcement can be provided intermittently. Reinforcer delivery on an intermittent schedule can be at fixed or variable increments. Fixed schedules of reinforcement require a predetermined measure of behavior to be observed before reinforcement is provided. In variable schedules of reinforcement, the measure of behavior that is required to produce reinforcement varies about an average.

Behavior can be measured to determine the schedule for reinforcer delivery by examining the frequency of responses, the duration of behavior, or the interval of time between the occurrences of a given behavior. On a *frequency schedule of reinforcement*, the number of occurrences of behavior is counted. Once the count of behavior is provided, either a fixed or variable number of responses will be required to produce reinforcement. In *duration schedules of reinforcement*, the amount of time that a behavior must continuously occur to produce reinforcement is determined. Either a fixed or variable duration of responding may be required. Finally, *interval schedules of reinforcement* require a certain amount of time between occurrences of the same behavior to produce reinforcement. The interval of time between behavior one and behavior two can be fixed or variable. Each of the schedules of reinforcement produces characteristic patterns of responding. Intermittent schedules have the advantage of maintaining behavior over increasingly long periods of time with minimal reinforcer delivery.

—Deirdre L. Fitzgerald

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RELIABILITY

Reliability refers to the consistency or stability of measurements. A test with good reliability means that the respondent will obtain the same score upon repeated testing, as long as no other extraneous factors affect the score. In actuality, a respondent will rarely obtain the exact same score over repeated testing because repeated assessments of any phenomenon will likely be affected by chance errors. Thus, the goal of testing is to minimize chance errors and maximize the reliability of the measurement with the recognition that a perfectly reliable measure is unattainable. Reliability is extremely important because evidence of reliability is necessarily the first step in establishing the scientific acceptance and usefulness of a test. Once reliability is established, the validity of the test can then be evaluated (validity is defined as the extent to which a test accurately measures what it purports to measure). The two most common forms of reliability are *test-retest reliability* and *scale reliability*.

Test-retest reliability is a measure of a test's consistency over a period of time. Test-retest reliability assumes that the construct being measured is relatively stable over time, such as personality. A good test manual should specify the sample, the test-retest interval (typically about 1 week to 1 month), and the reliability coefficient. If the construct is likely to change over time (e.g., perceived stress), then test makers will generally choose a shorter interval (e.g., 1 week). Test-retest reliabilities are reported and interpreted as correlation coefficients and are considered excellent if they are 0.90 or better and good if they are 0.80 or better. If a construct is thought to be relatively stable but the test-retest reliability coefficient for a test of that construct is around 0.50, it likely means that the test is unreliable. Perhaps there are too few questions on the test or some test questions are poorly worded. Another possibility is that some extraneous variable affected the construct during the interval. One final concern regarding the interpretation of test-retest reliabilities is that they may be spuriously high because of practice effects or memory effects. A respondent may do better on the second testing because the trait being assessed improves with practice. Some people may respond similarly to a second administration of a test because they remember the answers that they gave previously. One possible solution to these problems is the use of *alternate forms* of the same test.

Scale reliability (commonly called *internal consistency*) is a measure of how well the items on a test relate to each other. The standard statistic for scale reliability is Cronbach's (1951) coefficient alpha. One way of understanding Cronbach's alpha is to view it as an average of all of the correlations of each test item with every other test item. The alpha coefficient ranges from 0.00 to 1.00 and is interpreted like a correlation coefficient. Values above 0.80 are considered good and generally reflective of reliable (internally consistent) scales. The alpha coefficient is dependent on three important variables. First, the number of test items impacts alpha: shorter tests will generally yield lower coefficients than longer tests. Second, the alpha coefficient is dependent on a high first factor concentration (i.e., the test is measuring a single concept or trait). A scale that measures two components of a construct will have a lower alpha than a different scale that measures only one core concept. Third, the alpha coefficient is dependent on the number of participants who take the test. A higher number of participants (generally above 200) will yield higher alpha coefficients, whereas a lower number of participants (less than 100) will yield lower alpha coefficients.

—Daniel L. Segal and Frederick L. Coolidge

See also Validity

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RELIGION

Religion has played a central role in the cultural and community traditions of humankind since the beginning of civilization. Wherever ancient and modern peoples have settled and flourished, there has been a corresponding development of religious traditions that shapes the communities' perceptions of what is sacred and what is profane. Within the family circle, the child soon learns about areas, aspects, or rituals of life that are vital and important (sacred), and those that are merely mundane. That which is sacred transcends the profane. It is soon recognized as holy. Common to the three influential monotheistic traditions of the West, for example, God is described as the omnipotent and omniscient creator of the heavens and the earth who sustains all life and who abundantly provides for his creatures. These ideas and practices associated with the holy and sacred are the accepted doctrines and traditions of the religious community. When carefully woven together, these sacred customs and teachings form the fabric of faith.

While it is possible to describe the role of religion in the early development of the child from a general religious perspective, it is perhaps more appropriate to illustrate the great impact that religious belief can have on child-rearing practices from the perspective of a particular religious tradition, such as Judaism or Christianity. Within the sacred writings of Judaism, the Hebrew Bible (Tanakh), there are several texts that address the importance of passing religious beliefs and practices from one generation to the next. For example, the Deuteronomist records that shortly before his death, Moses, the great liberator and leader of the people of Israel, demanded that the people diligently keep the teachings and commandments given to them by God: "Now this is the commandment—the statues and the ordinances—that the Lord your God charged me to teach you to observe in the land that you are about to cross and occupy, so that you and your children and your children's children may fear the Lord your God all the days of your life, and keep all his decrees and his commandments that I am commanding you, so that your days may be long. Hear therefore, O Israel, and observe them diligently, so that it may go well with you, and so that you may multiply greatly in a land flowing with milk and honey, as the Lord, the God of your ancestors, has promised you." One can clearly see from this religious text the importance of maintaining the sacred traditions and holy doctrines from one generation to the next. Moreover, it is obvious that this religious teaching provides the people with important knowledge concerning their past, promises about their future, and commandments and doctrines about how to live life in the present. In other words, the great philosophical questions about origin (Where did I come from?), reality (Why am I here?), and destiny (Where am I going?) are neatly and definitively answered through religious belief. While most things are known and understood through experience and reason, the most important things concerning life and death can only be known by faith. As principle architect of about half of the New Testament, Saul of Tarsus—better known as the Apostle Paul—admonished the Corinthian Christians to live by the principle of faith, rather than be merely guided by reason alone. Within Judaism, believers would teach their children about God through acts of everyday life, no matter how mundane. Traces of the holy would often be seen in the profane. Moreover, within the sapiential wisdom literature of ancient Israel, there are many texts and traditions that demonstrate how religious beliefs in general inform child-rearing practices in particular. One ancient proverb, for example, matter-of-factly states: "Train children in the right way, and when old, they will not stray."

Through the process of time, children adopt the religious faith and practice of their parents, typically without much modification or change. Within certain Christian scriptures, there are teachings that stress the importance of instructing children and grandchildren about the central truths of the faith. In this way, the continuity of family traditions and religious beliefs will be ensured. In his second letter to his dedicated disciple Timothy, whom he considered to be his son in the faith, the Apostle Paul writes: "I am reminded of your sincere faith, a faith that first dwelt in your

grandmother Lois and your mother Eunice and now, I am sure, dwells in you." In yet another important sacred text, Christian children are directly commanded to honor and even obey their parents, while parents, on the other hand, are admonished to nurture and indoctrinate their offspring within the strict traditions and discipline of the faith.

It seems quite clear, therefore, that child-rearing traditions within the sacred texts of both Judaism and Christianity affirm the importance of religious faith and practice within the framework of the family, and that these religious traditions hold the promise of present and future blessings upon those who believe. From a strictly secular perspective, however, the role of religion in the life of a child, and on child-rearing practices, is ambiguous at best and detrimental at worst. Sigmund Freud, in his critical monograph on the subject of religion, for example, considered all formal religion to be simply an illusion of childlike fantasy for people who cannot manage the complex problems and severity of life. This is similar to the projection theory of Feuerbach, where man merely projects human-like attributes or characteristics upon the humanly created concept of God.

Although the phenomenon of religion has been considered to be an illusion or a projection, or even the opium of the people, according to Marx, the presence and influence of religion—in all its varied manifestations—will certainly continue to exist and thrive in the twenty-first century. Modern and even postmodern philosophies and worldviews have been impotent to erase the phenomenon of religion and its universal appeal and influence. It will continue to make its mark on society in general and on the consciousness of the developing child in particular.

—Ramón Anthony Madrigal

See also Buddhism, Catholicism, Islam, Judaism

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RESILIENCY

Resilience refers to the ability to thrive as an individual despite being exposed to serious adverse life circumstances, situations, stressors, and risks. Have you ever noticed how individuals who are exposed to the very same negative life event can react and respond in very different ways? One child in a family who has been exposed to the same marital conflict and bitter divorce walks away from the event apparently unharmed and continues to be happy and do well in school, while the brother or sister, after experiencing the same events, develops serious behavior problems and flunks out of school. In this example, the former child would be said to be more resilient than the latter.

The term *resilience* is used in two different ways. In the first sense, it simply refers to a fundamental characteristic of all children and human beings—that we are, in general, very adaptable, flexible, and quite good at surviving extraordinary negative life events. The human brain, body, and psyche are generally remarkably adept at changing and learning from experiences, and reorganizing themselves to make the best of difficult life circumstances. More commonly, however, the term resilience is used to refer to a psychological quality that varies somewhat from individual to individual. Simply put, some individuals are more resilient than others. Some children are able to recover from trauma and overcome risk factors that for other children seriously impede their development.

Because resilience, by definition, refers collectively to the characteristics of children who do well in the face of adversity, it is important to discuss the types of adversity or negative life experiences that have been studied. Any condition that is known to negatively affect children's development is called a risk factor. Situational risk factors that are known to have significant negative impacts on children's developmental outcomes include poverty, homelessness, child abuse, parental psychopathology (i.e., maternal depression, parental alcoholism, or substance abuse, schizophrenia), teen parenting, unemployment, single-parent homes, exposure to family violence, migrant/refugee status, and war. There are also individual risk factors that describe features of the child that put him or her at increased risk for negative outcomes. These include low birth weight or premature birth or the presence of a serious medical condition or a physical or developmental disability. By definition,

resilient children are those children who have been exposed to one or more of these risk factors but are still doing very well and achieving high competence in multiple developmental domains. Unfortunately, the majority of children with prolonged exposure to many of the above risk factors do not thrive or become highly competent individuals. Finally, it is important to note that advantaged children who thrive and do well but have *not* been exposed to any of these serious risk factors are not necessarily resilient; their resiliency can only be assessed after exposure to such risk factors.

The typical research strategy for those interested in resilience is to identify a group of children and families who have clearly been exposed to many of the above risk factors and evaluate how well the children are doing. "Doing well" has sometimes been defined as an absence of psychopathology (behavior problems, delinquency, depression, mental illness) in children, and other times, success is defined as the child having negotiated major developmental tasks of childhood effectively. These tasks vary depending on the age of the child. For infants and toddlers, the developmental tasks include forming a secure attachment relationship with their caregiver, acquiring language, differentiating self from other, and developing sufficient emotional and behavioral self-control. During middle childhood, competence in relevant developmental tasks might include a successful transition to school, the development of peer social skills, establishing friendships, and maintaining satisfactory academic progress in school. In adolescence, additional developmental tasks are introduced such as establishing a cohesive sense of self and identity. It is important to note that while some markers of competence such as acquiring language are more universal, other developmental tasks are greatly influenced by culture. For example, establishing a strong sense of individual identity and autonomy may not be considered an indicator of competence in all cultures.

Regardless of the criteria used to define competence, the next step in a resilience research program is typically to classify the at-risk children into two groups: those who are doing particularly well—the resilient children, and those who do not evidence high competence—the nonresilient children. These two groups of children are then compared using a variety of individual, family, and situational variables to see how resilient children are different from nonresilient children and to see what makes resilient children thrive in the face of adversity. The positive factors that seem to distinguish resilient children from their similarly at-risk peers are called *protective* or *buffering* factors. Protective factors have been identified as falling into three domains: individual, family, and external supports.

Individual protective factors are intrinsic characteristics of the child. The main individual characteristics that have been found to be associated with competence in the face of life stressors are high IQ or good intellectual functioning, strong language skills, an easygoing disposition or temperament, and strong self-efficacy beliefs or high self-esteem. Children with easy temperaments elicit positive attention and interactions from caregivers and strangers. Good eating and sleeping habits are also a part of an easygoing temperament, which leads to less disruption for parents. High self-esteem and accurate and realistic assessments of one's abilities also appear to be a protective factor for at-risk children. Resilient children often demonstrate a particular talent, a specific activity important to themselves and others that they are particularly good at, such as soccer or playing piano. Success in a particular skill area also facilitates children's subsequent positive interactions with peers and adults.

A close, warm, loving relationship to one's caregiver is the most powerful of the family protective factors that promote resiliency in childhood. Effective parenting characterized by warmth, structure, and high expectations fosters healthy development in unfavorable situations. As resilient children get older, a parent or other caregiver is typically viewed as a source of motivational support. Additionally, resilient children tend to both value and utilize immediate and extended family support more so than their nonresilient peers.

The most important protective factor within the external support category for resilient children is a close connection with at least one nonparent, prosocial, competent adult who acts as a mentor for the child. This is particularly important when little support is available from the child's primary caregivers. A trusted teacher, neighbor, regular caregiver, friend, counselor, community leader, or spiritual advisor has often been found to be a critical source of motivation and support for children able to overcome potentially overwhelming risk factors. As is the case with family support, resilient children appear to be more effective than nonresilient youngsters in securing and relying on external support systems in times of crisis. Finally, close friendships with one or more peers also distinguish

resilient children from others who do not weather stressors as well.

One of the advantages of taking a resilience perspective on development is that rather than focusing on the deficits and problems seen in children growing up under adverse circumstance, it places emphasis on children's strengths and the protective factors that help children overcome disadvantageous conditions. In addition, interventions to help at-risk children can be, and have been, based on increasing children's protective factors to help them become more resilient in the face of hardship. As the number of life stressors and risk factors accumulate, children need more and stronger protective factors in order to reach their full potential.

—Sue Hartman and Adam Winsler

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RETENTION

When students fall seriously behind grade-level achievement expectations at school, their parents, teachers, and other school personnel face difficult decisions about how to help them improve. Some parents and educators favor retention—that is, having struggling students repeat a grade—to give them time to mature or build their knowledge and skills in preparation for the next grade. An alternative is to pass the struggling students on to the next grade so that they can remain with their peers. This is called social promotion. In general, research has shown that neither retention nor social promotion alone provide struggling students with the support they need to reach grade-level expectations.

Public opinion favors retention over social promotion, and despite decades of research showing that retention is rarely effective and frequently harmful, it is fairly common. An estimated 7% to 9% of American students are retained each year, and by ninth grade, 30% to 50% of students will have been retained at least once. Retention is higher in first and ninth grade, probably because these are transition years. Retention rates are also higher for boys, minority students, and students from low-income families. Retention rates are likely to remain high in the United States because several states and school districts now require that students pass competency tests before promotion to certain grades. For example, the Chicago Public Schools require students to attain minimum scores on tests in third, sixth, and eighth grades for promotion. Retention is less common in developed nations other than the United States.

Numerous studies have compared retained students with similarly low-achieving students who were socially promoted. Retained students often show some improvement in achievement in the year following retention, but the gains fade over time.

Besides being ineffective, retention has been linked to poor outcomes over the long run. There is a stigma attached to retention, and students find it stressful. (In 2001, sixth graders rated grade retention as more stressful than either the loss of a parent or going blind!) Students who have been retained are older than their classmates and experience puberty ahead them, another possible source of stress. In comparison to other low achievers, students who have been retained are more likely to be assigned to special education, drop out of school, engage in illegal behavior, and have poor employment records.

In evaluating the effects of retention, it is important to consider the characteristics of the children who are retained and the experiences they have during and after retention. Prior to retention, retained students are more likely than low-achieving promoted students to have had behavior problems, including aggression; to have been immature; and to have had poorly educated

parents who were uninvolved in their children's education. These characteristics alone would make them more likely to experience long-term problems in school; unfortunately, retained students are frequently assigned to low ability groups. This compounds their problems, because low-ability groups often have many students with behavior problems, teachers with low expectations, and content of little interest.

Retention is more likely to succeed when children have positive attitudes toward school and good social skills, and they experience different teaching methods during their retention year. Educators now realize that regardless of whether struggling students are retained or socially promoted, they need special programs such as tutoring, summer programs, or alternative schools to help them succeed. Early intervention programs for children at risk of failure are also seen as a viable way to reduce the need for either retention or social promotion.

—Pamela P. Hufnagel

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RETIREMENT

Retirement is often defined as a withdrawal from active working life undertaken by older adults. Unfortunately, such a definition is hardly descriptive of the phenomenon. There are a number of reasons for this. First, the term retirement is used interchangeably to refer to both the act of retiring and the status of being retired. Second, the concept of retirement is a social construction, and as such, it is constantly being redefined by both the larger society in which it takes place and those engaging in it. For instance, social norms play a large role in determining at what point one becomes an "older adult." In addition, the notion that retirement involves withdrawal from active work life may be inaccurate for the many older adults who "retire" yet continue in some form of paid employment in their preretirement positions/occupations, start out on new careers, and so on. The third reason why defining retirement is difficult is because it has been studied by a variety of different disciplines, which have operationalized it in different ways ranging from receiving income from a pension to planned retirement age. Different disciplines have also conceptualized retirement at different levels of aggregation, ranging from macrolevel work force participation rates to macrolevel self-attributions of retirement status.

Although all of these issues make arriving at a clear and unequivocal definition of retirement difficult, we nevertheless define the term retirement here as the process by which older adults come to reduce their reliance on the work role as a source of income, identity, or meaning. Through this definition we recognize retirement as a social, economic, and personal construct. In the section that immediately follows, we describe some of the trends leading toward the phenomenon of retirement. Then, we discuss the retirement process in two parts: In the first part we discuss issues related to the "act," or decision to retire; in the second part we discuss issues related to "status" of being retired.

RETIREMENT TRENDS

Prior to the 1900s, retirement was uncommon, thus retirement is a relatively new phenomenon, having emerged primarily among industrialized nations in just the last century. Most people (predominantly men) who worked outside of the home at that time continued to work as long as physically possible. The reasons for the emergence of retirement can be linked to a number of demographic trends including a decline in the average age at which individuals retire and the decreased workforce participation rates of older adults. At the start of the 1900s, the average age of retirement is estimated to have been about 66 years old. By the end of the century, it had declined to

approximately 62 years of age. While at first glance this 4-year decline in the average age of retirement over the course of the last century does not appear very dramatic, it does have an important impact when one considers it at the aggregate level, expressed in terms of the workforce participation rate. For instance, just prior to the start of the 1900s some 75% of men in the United States over the age of 65 participated in the labor force whereas by the year 2000 this number had dropped to only about 18%. We hasten to add, however, that this trend toward lower workforce participation began leveling off after 1985.

These changes in the average age at which an individual retires and the workforce participation rate for older adults become even more significant when one considers the progressive aging and increased longevity of the population. The progressive aging of the population is largely attributable to the aging "baby boom" cohort made up of those born between 1946 and 1964. Currently, the members of this cohort consist of approximately 80 million adults who are quickly reaching the age where retirement is becoming a realistic option. Similar trends are apparent across most industrialized nations. Regarding longevity, within the United States, the average life expectancy at birth has increased from the late 40s in 1900 to the late 70s in 2000. Based on all of these trends, we can surmise that over the next few decades there is going to be a substantial number of people experiencing retirement and that they will be experiencing it for a substantially longer duration than at any time in the past. Thus, it is imperative for us to better understand the factors that contribute to the decision to retire.

The Decision to Retire

Retirement decision making has been the topic of empirical research among those in a number of areas such as economics, sociology, business, industrial/organizational psychology, and gerontology. Perhaps as a result of the variety of perspectives these different areas bring to the study of retirement decision making, there is no universally accepted theory of retirement decision making. Rather, in most cases, each discipline has attempted to explain retirement decision making by applying the theoretical lens from within their own discipline. For example, economists have employed theories about the economic trade-offs between work and leisure that determine whether or not one will work as well as the timing of that work over the life cycle. In essence, this approach frames the retirement decision as a rational economic choice between when to work and when to spend and, as a result, tends to focus attention on the effects of financial resources on the decision to retire.

Those taking a more sociological perspective have applied theories surrounding the interplay age and the larger social context to examine how social policies, structures, and social norms influence retirement decision making. In the areas of business and industrial/organizational psychology, researchers have applied self-image theory, role attachment theory, and models of organizational withdrawal to retirement decision making. These tend to emphasize the importance of maintaining a positive self-image and membership in valued roles and also direct attention to working conditions and work-related attitudes. Gerontologists have applied theories of adult development and aging to retirement; for example, continuity theory.

Although these various perspectives and approaches to understanding retirement decision making may seem quite different from each other, they share certain commonalities. Perhaps the most important commonality is that each suggests that the decision to retire is a longitudinal process that begins long before the actual decision is made. It is also important to note that each of these different perspectives and approaches has contributed to our understanding of retirement decision making. Taken together, they provide an impressive literature regarding the factors that influence the decision to retire. In the section that immediately follows, we review some of the main findings of this literature.

FACTORS RELATED TO THE DECISION TO RETIRE

Environmental Factors

Perhaps the most important environmental influences on retirement decision making are the availability of public and private pension programs and laws surrounding age discrimination. Chief among the public pension programs is the Old Age, Survivors and Disability Insurance program enacted by the passage of the Social Security Act of 1935, which provides some level of income when one can no longer work. Though the specific ages at which benefits become available is changing, historically this program has provided "full" retirement benefits at age 65 and a reduced level at age 62. Not surprisingly, these

are also the ages at which the most significant declines in work force participation rates have occurred, and a long line of research has supported the connection between the two.

Along the same lines as social security, the availability of private pension benefits for those between the ages of 55 and 60 has also been reliably linked to retirement decisions and declines in work force participation rates in that same age range. The 1986 amendment to the Age Discrimination in Employment Act (originally passed in 1967 to protect workers age 40 to 65 from discrimination in employment decisions) eliminated the practice of mandatory retirement for most workers in the United States. While organizations still have a variety of mechanisms by which to encourage retirement (e.g., early retirement incentives), some have linked the lifting of mandatory retirement with the leveling off of the trend toward lower work force participation rates that began to occur after 1986.

In addition to these, three other macrolevel influences are the social norms that have emerged (influenced at least in part by the legal developments above) surrounding retirement, changes in governmental regulations, and general economic conditions. Retirement norms, which set expectations regarding the timing of the decision to retire, do exist. These are established and communicated through the timing of when social security and private pension benefits become available and through interactions with coworkers, friends, and family. Current estimates suggest that many people see ages 62 and 65 as the appropriate and expected retirement age. In addition, changes in governmental regulations, such as the recent removal of earnings limits on social security benefits for those aged 65 to 69, may also impact individuals' decisions about when to retire. Regarding economic conditions, some research suggests that organizational munificence is negatively related to retirement decisions, while a high local unemployment rate may be positively related to retirement decisions.

Working Conditions and Attitudes

It would seem logical that the characteristics of one's job would be related to retirement decision making and the research to date supports this logic. For instance, studies have found that those in physically demanding jobs as well as unrewarding and stressful jobs are more likely to retire earlier. In addition, empirical research supports a reliable relationship between job characteristics such as autonomy, variety, interaction with others, feedback, task identity, and task significance, often combined to form an overall score, and the decision to retire earlier. Some evidence also suggests that positive affective reactions to work (e.g., job satisfaction) are related to the decision to retire later. Similarly, research supports the idea that commitment, including general commitment to work, organizational commitment, and career commitment, are related to the decision to retire later.

Familial Factors

Although not studied as widely as other variables, the decision to retire is often made within the context of the family, and family-related variables do play a role in this part of the retirement process. One general finding is that married couples tend to coordinate their retirement decisions such that they retire at similar times. However, this relationship is by no means universal and may depend on the quality of the marital relationship and family life, the presence of dependents in the home, and the health and gender of the spouse. Because a considerable amount of time spent in the status of retirement may also mean time spent with family, the quality of the marital relationship and family life is important. Those with poorer quality family relationships are less likely to retire than those with higher quality family relationships. With regard to having dependents, including children, grandchildren, and parents in the home, the relationship between this factor and retirement decision making likely depends on gender and the acting out of traditional gender roles. For men, the presence of dependents in the home can be perceived as creating financial demands that must be met through continued work (the "bread winner" role for men). As a result, men are less likely to retire. For women, on the other hand, the presence of dependents in the home can be perceived as creating demands that must be met through care giving. As a result, women are more likely to retire.

Individual Factors

Compared to familial factors, the relationships demographic and other individual factors have with

retirement decision making have been studied quite often. Among the demographic factors, age, health, wealth, and education level have probably been studied most often. While it is certainly true that when one considers the entire age range of adults, it is the older adults who retire, there is some evidence that younger workers today intend to retire at earlier ages than older workers. In addition, those with health limitations and those who can financially afford to stop working are more likely to retire than those in good health or who need to maintain their income from paid work. Although the results are somewhat less robust, education level has also been linked to retirement decisions such that those with lower education levels are more likely to retire at earlier ages than those with higher education levels. Beyond these demographic variables, attitudes toward retirement have also been shown to be related to the decision to retire. Not surprisingly, those who view retirement positively tend to express a desire to retire sooner rather than later.

In summary, a number of disciplines have contributed to our understanding of the process of retirement decision making. Still, there are a number of areas that warrant further research attention, one of which involves examining the role of early retirement incentive programs. In addition, recent developments in and increasing access to procedures to model processes over time and at various levels of aggregation (i.e., latent growth curve modeling, random coefficient modeling) could be employed by researchers.

THE STATUS OF RETIREMENT

Theories of Retirement Adjustment

Theory on retirement adjustment has typically taken one of several approaches. The first focuses on examining retirement in terms of role theory. That is, retirement is viewed as a role that individuals engage in and transition to, similar to that of the role of worker, spouse, parent, or other socially created and defined roles. A second theoretical approach to examining retirement adjustment has focused on different retirement styles. For example, some have discussed four different styles or modes of adaptation to retirement, one of which is referred to as *transition to old age,* where the older individual sees retirement as a time to wind down and disengage. The *new beginnings* style entails welcoming retirement with a new sense of freedom and increased vigor, while older individuals who use a *continuation* style would see little difference from pre- to postretirement. Finally, those retirees having the *imposed transition* style see retirement as a significant role loss. Thus, engaging in different modes or styles of retirement appears to have implications for how retirees transition and adapt to retirement, as well as the significance they place on the role of retiree.

A third theoretical approach to examining retirement adjustment has been to characterize the retirement process as a series of phases or stages that one passes through. One of these models discusses seven phases that individuals *may* go through as they transition into, through, and out of retirement. According to this model, initially individuals are in the *remote* phase where retirement is characterized as a distal event and where individuals typically have only a vague concept of retirement. By the *near* phase, individuals realize that retirement is not that far off and begin serious planning and preparation for retirement. The *honeymoon* phase occurs immediately after the retirement event itself and is typically characterized by a sense of freedom and maybe even euphoria of not having to deal with the daily grind of work. By the *disenchantment* phase, retirees may begin to obtain a sense that retirement may not be exactly what they expected. However, most individuals will go through a fifth *reorientation* phase where they are able to realign their preretirement expectations with the realities experienced once they retired. Most individuals will then settle into the sixth *stability* phase where the role of retiree begins to become more comfortable and routine. In the seventh and final *termination* phase, individuals no longer are engaged in the retiree role, typically due to morbidity or mortality.

While these three broad approaches to understanding and explaining the retirement adjustment process may appear to differ on the surface, they have important common characteristics. For example, all three approaches see retirement as a continuous process of preparation, transition, and then adjustment. Retirement is not viewed as a single decision that older individuals briefly engage in or as an event that occurs ever so briefly. Instead, retirement preparation, transition, and adjustment are viewed as long-term processes that individuals actively engage in. In fact, most people understand that they will eventually retire and begin thinking about it long before the "event" actually takes place.

Retirement Myths

A number of studies have been conducted to examine the process of retirement and how individuals prepare for, transition to, and adjust to this increasingly prominent role in late life. Most empirical studies indicate that several myths regarding retirement and the adjustment to retirement do not appear to hold true. For example, it was long assumed that retirement "caused" illness and poor health. Often is heard the anecdote of so-and-so who retired and got sick and died! Most epidemiological research indicates that those experiencing poor health immediately after retirement were experiencing poor health prior to retirement. Thus, while some health problems are inevitable as we age, it does not appear that retirement itself "causes" these ills.

In addition, the myth that retirement is very stressful and a time of "crisis" has not been supported by research. While some individuals do experience high stress during the transition to retirement, usually coincidental with other stressful life events, a majority of older individuals typically do not experience a true "crisis." Instead, older individuals experience relative continuity in life, where some roles are decreased (worker), while other increase (volunteer, grandparent) to replace the diminished work role. Similarly, another myth is that a majority of older individuals migrate to warm weather climates after retirement. In fact, less than 10% of retirees move out of state after retirement. Family and social contact networks that have evolved over the course of a lifetime are cherished and used to help smooth the transition and adjustment to retirement.

Finally, the myth of the retiring husband suddenly "being under foot" and thus causing marital discord appears to be highly exaggerated. While some adjustment period is warranted in most marriages when one or both spouses retire, most couples report improved, rather than diminished, marital relations after retirement. This of course assumes that the retirement does not coincide with a negative life event such as poor health on the part of the retiree or spouse.

Preretirement Planning

One line of research on retirement adjustment has examined the effects of preretirement planning on the transition to retirement. Not surprisingly, those individuals who engage in more preparation for retirement, whether formal or informal, tend to adjust better to the retirement role than those who fail to prepare. In fact, most retirement planning takes the form of informal discussions with spouse, family, and friends. However, for most individuals, this appears to be adequate to allow for a relatively smooth transition to retirement. In addition, these positive effects of retirement planning appear to hold for both civilian workers and military personnel transitioning to retirement.

Gender Difference in Retirement Adjustment

Another line of retirement adjustment research has examined gender differences in retirement, as well as the extent to which retirement is indeed a "coupled" experience. While early work on retirement focused almost exclusively on men's (predominantly white men's) retirement experiences, more recent work has looked at both men's and women's retirement experiences. The more recent research appears to indicate that men's and women's experiences of retirement can be similar, especially when they have experienced similar work histories. In addition, individuals who are married and in dual career relationships often try to time their retirement to coincide with their spouse's retirement. However, to the extent that men and women have different personal (e.g., health), nonwork (e.g., dependents in the household), and work-related (e.g., work role attachment) dynamics, they will experience retirement in a different way. Given that such gender differences often do exist in these dynamics, some have warned against using the "male model" of retirement to explain women's adjustment to retirement.

Postretirement Employment

The transition to retirement has become a "blurred" process in that most individuals do not simply stop working one day, after 25 or 30 years with the same company. Instead, a majority of individuals transition slowly out of the workforce through phased or partial retirement in the same job or occupation, by engaging in some form of postretirement employment in a different job or occupation, or by moving back and forth between being retired and employed, until eventually exiting the labor force completely. Thus, the effects of postretirement employment (usually referred to as bridge employment) on retirement adjustment have only relatively recently been examined. While bridge employment can have beneficial effects on retirement adjustment, they are by no means

universal. In particular, if retirees feel they are forced to return to work for, say, financial reasons, retirement adjustment tends to be negatively impacted. The key to maximizing the beneficial effects of bridge employment on retirement adjustment is the degree of match between the retirees desired level of work involvement in retirement and their actual level of involvement. The better the match, the better adjustment tends to be. This result appears to hold for both paid and volunteer work activities.

In summary, generally older individuals who are healthy, have adequate income, have planned and prepared for retirement, have a strong social network, and who have an adaptive personality style tend to adjust better to retirement than those who do not possess these qualities. While most individuals do tend to eventually adjust well to retirement, continued research is needed to address the reasons why some individuals fail to make this adjustment. Unfortunately, solid research and theory on other behavioral and cognitive strategies for positively adapting to retirement are still lacking. Thus, more research is needed to determine why some fail to adjust well why others adjust well and even thrive in retirement.

—Gary A. Adams and Kenneth S. Shultz

See also American Association of Retired Persons (AARP)

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RETT SYNDROME

Rett syndrome (RS) is a pervasive neurodevelopmental disorder that almost solely affects females. Of importance for understanding its developmental course, it is not a generative disorder. RS is marked by apparently normal development for 6 to 18 months followed by rapid physical and mental deterioration. Although estimates vary, RS occurs in about 1 in every 10,000 to 15,000 female births worldwide, affecting all racial and ethnic groups.

GENETICS OF RS

The discovery in 1999 that RS is associated with a mutation of the MECP2 gene, located on X-chromosomes, confirmed the disorder's long-inferred genetic basis. The mutated gene on one X-chromosome is sufficient to produce RS. Occurrence of RS appears to owe to random mutation, and is thus genetic but generally not inherited; recurrence rates within the same family are less then 0.4%.

Recent evidence suggests that the mutation most often occurs in the father's sperm. Because the father passes on an X-chromosome to his daughters and a Y-chromosome to his sons, only daughters receive the mutated MECP2 gene. Thus, the theory that RS is lethal prenatally to males is believed to be incorrect. In line with the current theory, RS has been reported in some males with an extra X-chromosome who show characteristics of both Rett and Klinefelter syndromes.

Apparently, the MECP2 gene is normally involved in switching off other genes. The mutated gene allows other genes to inappropriately switch or stay on, disrupting normal development. This previously unknown malfunctioning process has implications for understanding not only RS, but other neurodevelopmental disorders and perhaps even apparently unrelated conditions such as Alzheimer's disease.

DIAGNOSIS AND CHARACTERISTICS

Often misdiagnosed in the past, commonly as autism or cerebral palsy, RS now has agreed upon

necessary, supportive, and exclusionary diagnostic criteria. Necessary criteria include apparently normal pre-, peri-, and early postnatal development; deceleration of head growth beginning from 3 to 36 months of age; loss of acquired skills (voluntary hand skills; verbal and nonverbal communication skills) beginning at 3 to 36 months of age; appearance of obvious mental retardation and intense and persistent hand stereotypies (hand wringing/squeezing, washing/patting/rubbing, mouthing/tongue pulling) in early childhood; and gait abnormalities in ambulatory cases.

Supportive criteria include breathing dysfunctions, bloating and marked air swallowing, EEG abnormalities, seizures, spasticity, muscle wasting, peripheral vasomotor disturbances, scoliosis, hypotrophic small and cold feet, and growth retardation. Exclusionary criteria (presence excludes diagnosis of RS) include signs of storage disease, retinopathy or optic atrophy, microcephaly at birth, existence of metabolic or other hereditary degenerative disorder, neurological disorder from severe infection or head trauma, intrauterine growth retardation, and peri- or postnatal brain damage.

DEVELOPMENTAL COURSE

Classic RS generally develops through a four-stage sequence of behavioral and physical changes. However, it has variable expressivity, so individual differences characterize which features are manifested and the age of onset, duration, and transition across stages. (1) *Early-onset stagnation* (onset: 6–18 months; duration: months) is characterized by developmental stagnation, deceleration of head growth, and hyptonia; diminished eye contact, communication, hand-use ability, interest in play and the environment; and development of random movements. (2) *Rapid developmental regression* (onset: 12–36 months; duration: weeks to months) includes the appearance of hand stereotypies; onset of sleep disturbances, breathing irregularities, and seizure-like spells; and deterioration of cognitive functioning, hand use, and expressive language. The child's behavior may resemble, and be diagnosed as, autism. (3) *Pseudostationary* (onset: preschool age; duration: to about 10 years of age) is characterized by a decrease in autistic-like features; fixed gait and stance; increased severity of mental retardation, breathing irregularities, bruxism, body rigidity, and seizures; and development of scoliosis. (4) Late motor deterioration (onset: 10 years of age; lifelong duration) includes loss or decrease in expressive or receptive language and remaining motor function, including chewing, swallowing, and walking; and increase in rigidity, scoliosis, and muscle wasting. However, many parents report that their adult daughters show improvements: in the form of (a) decreases in sleep problems, irritability, wide mood swings, seizures, panic attacks, and hand stereotypies, and (b) increases in voluntary hand use, such as cup holding, and communication through "eye pointing." Since most diagnosed females with RS are less than 18 years old, information on life expectancy is limited, but many will live well into their 40s.

Treatment

No overall effective treatment for RS is available, although some symptoms can be managed. Treatment is specific to the individual and the severity of symptoms at any particular time. A multidisciplinary approach is necessary, typically beginning with treatment from a neurologist and/or developmental pediatrician. Medication effectively controls, and physical therapy reduces, many symptoms. Lifelong physical, occupational, and speech therapies are often necessary, as are academic, social, vocational, and supportive services. Specific treatments include medication for seizures and agitation, and braces, surgery, and physical therapy for scoliosis. Behavior modification has had limited effectiveness. Alternative communication techniques (e.g., augmentative communication) may be useful. Music therapy is often used to help children with gross motor and manipulative skills, environmental awareness, and receptive and expressive language.

Affected girls will require lifelong care and supervision, placing a heavy burden on caregivers. Families may benefit from regular counseling concerning their daughters' condition and treatment and will often need a variety of supports.

POSSIBLE FUTURE DEVELOPMENTS

The discovery of the genetic basis and recent development of a mouse model have led to several promising avenues of research. These include discovering the mechanisms by which the mutated MECP2 gene manifests itself; determining how to "silence" the effects of the mutation; and developing treatment,

such as stem cell transplants, that may halt or reverse the course of the disorder.

—Robert T. Brown and Kathleen McMillan

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RH FACTOR

Rhesus monkeys have contributed greatly to our understanding of human physiology but perhaps their most significant role was in the discovery of the Rh factor. So great was their contribution that this protein substance of the red blood cell was named the Rhesus Factor.

It had long been known that some substance present in human blood, when administered to another human, caused "agglutination" or clumping of the recipient's blood. Similar to injection of ABO incompatible blood, the patient would respond by building up antibodies even when the blood groups were the same. In other words, even if two people had type B blood, a transfusion was not always successful.

Having already documented the first three human blood groups—A, B, and O—in 1901, Karl Landsteiner, an Austrian physician, and Alex Wiener, while conducting research 38 years later in New York City, discovered a final clue to the mystery of blood incompatibility. They observed that a protein substance that Landsteiner named the Rhesus factor had the ability to induce intense antibody response when Rhesus monkey blood was transfused into a rabbit. Agglutination or clumping occurred in the majority of specimens. When human blood was mixed with the same rabbit serum, red cells clumped together in a majority of the specimens. Such blood was typed Rh positive. The blood of the remaining specimens lacked the factor and was typed Rh negative.

In normal life circumstances, there are two critical times when bloods of separate individuals mingle—transfusion and pregnancy. In a human without the Rhesus factor, introduction of the factor (the antigen) causes an immunologic response (antibody formation) in the recipient. If an Rh-absent (negative) mother gives birth to an Rh-present (positive) baby, or if Rh-positive blood is transfused into an Rh-negative person, the negative factored person will begin to develop antibodies that attach to the Rh-positive red blood cells, causing them to clump together. The action of these antibodies is *hemolysis* or destruction of the red blood cells. The initial insult (e.g., a first pregnancy) may pass unnoticed; however, introduction of more Rh positive cells (a second pregnancy) may trigger the activation and release of more antibodies, which may cause significant anemia in the mother or destruction of red blood cells or hemolytic disease in the fetus/newborn (erythroblastosis fetalis). Hemolytic disease may be minor and responsive to supportive therapy or treatment, or it may result in significant illness and death.

Every mother is tested at her initial obstetrical visit; her Rh factor is noted as is the presence of any antibodies. If she is Rh negative, a protective dose of "Rh IgG," an immunoglobulin (RhoGAM), is administered by injection at 28 weeks gestation. This suppresses antibody formation for the last trimester of pregnancy. Upon birth, the mother is tested again for antibody formation and, if the baby is Rh positive, another dose of RhoGAM is administered within 72 hours to protect future babies from maternal antibody development that might destroy his or her red blood cells. The immunoglobulin would also be administered in the event of any maternal injury, bleeding in the second or third trimester, or after a miscarriage or induced abortion. Since the introduction of RhoGAM, the risk of Rh incompatibility has been reduced from 10% to 20% to less than 1%.

About 85% of Caucasians and 92 to 96% of African Americans are Rh positive; 99% of Native Americans and those of Chinese and Japanese descent are Rhesus positive, while 30% to 35% of Basque descendants are Rh negative.

—Margaret Plumbo

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RHEUMATOID ARTHRITIS

Rheumatoid arthritis can occur throughout the life span and takes various forms in childhood and the adult years. We will briefly review these disorders by age group.

CHILDHOOD-ONSET ARTHRITIS

Juvenile rheumatic diseases (JRD) are a heterogeneous group of disabling autoinflammatory diseases. Juvenile rheumatoid arthritis (JRA), systemic lupus erythematosus (SLE), juvenile ankylosing spondylitis (JAS), and juvenile dermatomyositis (JDM) are the primary subtypes of JRD; all are believed to be related to abnormal immunological control. The specific etiology of these diseases is largely unknown, and no cure is presently available. It has been stressed that the occurrences of these diseases are multifactorial, including genetic, immunological, and infectious triggers. Trauma and stress are also possible triggers for JRD. Findings suggest that multiple pathways may result in a diagnosis of JRD, including abnormalities of immunologic regulation, psychological stress, trauma, hormonal abnormalities, and infection.

JRDs have many common features, including an unpredictable disease course with periods of remission and relapse. Children diagnosed with one of these rheumatic diseases commonly experience pain, muscle weakness, fatigue, and functional disabilities. There is also great variation in the rate of onset of the clinical manifestations of these diseases; making a diagnosis can take months or years.

Of all the JRDs, juvenile rheumatoid arthritis (JRA) is the most common. Onset is typically before age 16 and can be as early as 6 months of age. The estimated prevalence rate of children diagnosed with JRA in the United States is approximately between 16 and 150 children per 100,000 individuals, girls being affected twice as often as boys.

The role of psychological variables in JRD has been widely examined. It is believed children and youth with JRD may be more susceptible to psychological complications due to the characteristics of the disease: physical deformity, disability, and chronicity. In addition, the uncertain prognosis, invisibility of the condition, and a remitting disease course serve as additional risk factors for psychological distress. It is not surprising that children with JRD are at increased risk for experiencing a host of psychosocial adjustment difficulties, including depression and dysthymic disorder as well as social difficulties. Increases in both negative daily moods and daily stressful events have been associated with reports of fatigue, stiffness, and decreases in daily activities.

Currently, there is no known cure for the juvenile rheumatic diseases. Treatment aims include controlling

inflammation, pain, and range of motion, preventing joint deformities, and maximizing functioning, as well as increasing and amplifying psychosocial adjustment. Additional treatment goals consist of increasing muscle strength and function, managing systemic involvement, and facilitating healthy nutrition and physical development. Children diagnosed with JRD may receive multiple medications and/or utilize resources and treatments from a number of medical specialists (e.g., pediatric rheumatologist, physical therapists, occupational therapist, nurse, nutritionist, psychologist, orthopedic surgeon). Some of the medications commonly utilized to treat JRD include nonsteroidal anti-inflammatory drugs, gold hydroxychloroquine, antimalarial drugs, D-penicillamine, sulfasalazine, methotrexate, intravenous immunoglobulins, monoclonal antibody treatments, and corticosteroids. These medications are primarily designed to control pain, preserve range of motion and function, and manage systemic complications.

ADULT-ONSET ARTHRITIS

Rheumatoid arthritis (RA) in adults is also characterized as an autoimmune disease involving inflammation of the joints, resulting in pain, stiffness, and loss of function. RA typically occurs in symmetrical patterns, and often involves the finger joints closest to the hand, as well as the wrist. RA can also occur in any number of other joints, including the feet, ankles, hips, and neck. Such symptoms may also be accompanied by fatigue, fever, and a general sense of malaise. Not unlike the childhood forms, the causes of RA are thought to be multifactorial, involving a combination of genetic, hormonal, environmental, and stress influences. Once a diagnosis is made, the course of RA may be quite unpredictable, with periods of exacerbations or "flares" followed by periods of remission. Some individuals experience only mild to moderate degrees of disease activity, while others may have severe forms that result in significant joint damage, pain, and disability. It is currently estimated that RA affects approximately 2.1 million Americans. Women are two to three times more likely to be diagnosed with this disease. Onset is most likely to occur in middle-aged to older adults.

Depression and depressive symptomotology are frequently observed phenomena in individuals with RA. Research has also suggested that increased pain and disability are important concomitants of depression. Notably, it has also been demonstrated that individuals with similar levels of pain and disability often experience quite different levels of depression, thereby suggesting the contribution of other intervening psychological variables. Indeed, cognitive appraisal variables, such as attributional style, have been implicated in the development of depressive symptoms.

Just as is the case with childhood forms, RA has no known cure at this time. The primary goals of treatment are to reduce pain and stiffness, to decrease the rate of joint damage, and to enhance the individual's quality of life. A wide variety of treatment approaches have been utilized in the treatment of RA. Lifestyle modifications are typically encouraged and include appropriately designed exercise programs, scheduled rest periods, joint care procedures (e.g., splinting devices), and stress management. Interventions may also include surgeries for joint replacement and tendon reconstruction. A wide variety of medications have also been used to treat the pain and stiffness associated with RA, or to slow its progression. Such medications include the analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs) such as acetaminophen, aspirin, and ibuprofen, corticosteroids such as prednisone, and the disease-modifying anti-rheumatic drugs (DMARDs), including azathioprine, cyclosporine, and methotrexate. A new generation of drugs, known as biologic response modifiers, is also being used now to treat the inflammation and joint damage associated with RA. Examples of such medications include infliximab, adalimumab, and etanercept, all of which work by blocking the action of cytokines.

—Larry L. Mullins, John M. Chaney, and Molly White

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RIGHT-TO-DIE MOVEMENT

The "right to die" is an umbrella term that denotes not a unified movement but rather a collection of various advocacy groups that have asserted a range of ethical and legal positions about when and how a human life may be deliberately terminated with legal impunity. Among these groups are those who argue for a natural or civil right to self-determination, even over the manner and timing of one's death, a so-called right to "rational suicide" or "self-deliverance" under certain conditions (or, much the same position has been argued on utilitarian grounds, rather than as a matter of individual rights); those who would permit legally assisted euthanasia (or "mercy killing" or "assisted suicide") of terminally ill, brain-dead, or acutely suffering patients, respectively; those who promote a generalized "death with dignity" that clarifies a person's wishes for end-of-life medical treatments through a living will stipulating those terms in advance; and those who participate in hospice outreach care that addresses issues of medical treatment, palliative measures, pain management, and comfort for dying individuals and their families and loved ones. "Passive" euthanasia is often distinguished from "active" euthanasia, which is the difference, for instance, between a physician withholding life-support systems such as feeding tubes versus someone proactively administering lethal drug doses in order to hasten death. Some of the prominent right-to-die groups include the Society for the Right to Die, the Hemlock Society (renamed in 2003 as End-of-Life Choices), Voluntary Euthanasia Society, Dying with Dignity, Death with Dignity, Compassion in Dying Federation, Partnership for Caring, and Dying Well Network. The World Federation of Right to Die Societies, founded in 1980, consists of 38 organizations from 23 countries.

The modern origins of these groups date back to the world's first euthanasia society founded in London in 1935 and the Euthanasia Society of America, founded in New York in 1938 (renamed the Society for the Right to Die in 1974). The following notable historical events led to the formation of the contemporary right-to-die organizations. In 1967, attorney Louis Kutner wrote the first living will. In 1969, Elisabeth Kübler-Ross published *On Death and Dying*, a book that drew wide attention to public issues about dying. In 1976, the New Jersey Supreme Court ruled that the parents of Karen Ann Quinlan, a comatose woman who had suffered brain damage, could disconnect her body from the respirator. In 1984, the Netherlands became the first country to approve voluntary euthanasia. In 1990, the U.S. Supreme Court ruled, in *Cruzan v. Director, Missouri Department of Heath*, that competent adults have a constitutionally protected liberty to refuse medical treatment, though the court insisted on proof of a patient's wishes by "clear and convincing evidence."

In 1991 Derek Humphry, founder of the Hemlock Society, published *Final Exit: The Practicalities of Self-Deliverance and Assisted Suicide*, a book that became a bestseller and helped mobilize a number of state referenda to approve assisted suicide. Only one of those state initiatives passed: In 1994 Oregon voters approved a Death with Dignity referendum which, after legal challenges, took effect in 1997, thus making Oregon the first and only state to legalize physician-assisted suicide. In 1997 the U.S. Supreme Court basically reversed course from the *Cruzan* case, now ruling unanimously in *Washington v. Glucksberg* that states may indeed outlaw doctor-assisted suicide, thus establishing the principle that a general public right to assistance in committing suicide is not a fundamental liberty guaranteed by the Constitution.

In 1999, Dr. Jack Kervorkian was found guilty of second degree murder in Michigan, whereas in the previous 10 years he had assisted in the deaths of 120 people and yet eluded criminal conviction up to that point. In 1998, Michael Schiavo petitioned a Florida court requesting that his wife, Terri, who had been severely brain-damaged in 1990, be removed from life-prolonging medical procedures; the Schiavo case became the latest and one of the nation's most bitterly fought right-to-die cases, winding its way through numerous Florida courts, the Florida legislature, the Florida Governor's office and the Supreme Court of the United States. While most right-to-die controversy has focused on the United States and the Netherlands, numerous right-to-die campaigns involving legal challenges, informational conferences and newsletters, medical and technological research, and other such activities have been initiated in recent years in other countries.

The modern salience of the right-to-die movement is probably symptomatic of a number of large-scale shifts in population demographics, advances in medical technologies, and changes in the economics of health care delivery. The basic sociological fact underwriting much of the movement is that a smaller

percentage of the population in industrialized countries now dies a "natural" death, i.e., free of aggressive late-terminal medical intervention. Instead, a host of life-prolonging medical treatments is brought to bear upon the elderly, the infirm, and the dying.

Another facet is that people are living longer. In the United States, for instance, male life expectancy increased from 46.3 years to 74.4 years between 1900 and 2001; female life expectancy during that period rose from 48.3 years to 79.8 years. Yet the site of death has shifted dramatically from residential locations to hospitals and other institutions. In 1936, only 35.1% of all Americans died in hospitals and institutional settings; by 1994, that figure more than doubled, rising to 73.8%. In the majority of cases, physicians and other health care providers have made a concerted effort to keep these increasingly hospitalized patients alive, using the latest medical techniques and technologies available to them. Yet the right-to-die movement does not impact simply the elderly; many of the most dramatic cases have centered on brain-damaged young women, such as Karen Ann Quinlan (1975–1985), Nancy Cruzan (1983–1990), and Terri Schiavo (1990–2005). By 2000, 45 states had authorized both a living will and the appointment of a health care proxy for an "advance directive" in such dire situations; four states permit only a health care agent, and one state permits only a living will. While assisted suicide is legal only in Oregon, right-to-die proponents contend that a de facto practice is widespread throughout the country, enacted, when necessary, by compassionate physicians who quietly withhold medical treatment or else prescribe virtually lethal doses of morphine to hasten death. Whereas American culture once viewed the terms of death primarily as a private family matter, changing demographic, legal, and economic concerns have forced the issue into the public domain, where courts and congresses must now wrestle with and renegotiate the proper boundary lines between privacy rights and public oversight and between state and federal jurisdictions.

Right-to-die advocates frequently contend that the thicket of constitutional, cultural, and technological issues reduces down to a basic ethical insight; to see an anguished family member or loved one suffer at the time of death prompts bystanders and survivors to seek alternative, more humane approaches to the end of a life. Instead of having to shop around for a sympathetic physician—increasingly difficult in an era of bureaucratized health care as well as medical malpractice lawsuits—terminally ill patients and their family members in all states, they contend, should have uniform access to medical assistance (or the refusal of medical intervention) in expediting the inevitable, albeit with proper safeguards in place. Such a position has galvanized a significant backlash as well. A number of groups have organized to contest the ethics of modern euthanasia. Many of these groups espouse a religious perspective, contending that euthanasia is a form of murder and that suicide is never to be condoned. The preservation of life, the unconditional affirmation of the sanctity of life, is of paramount importance, they submit; and a physician's obligation is to prolong life at all costs, regardless of a patient's expressed wishes.

Others argue on more utilitarian grounds against the legalization of assisted euthanasia. They worry that the marginalized of society—the elderly, the disabled, persons of color, the poor, the unloved, the depressed—are more likely to be subject to such termination procedures. They point out that family members may well be factoring in the high cost and financial burden of medical care that may influence their judgment about how long to sanction and to endure life-sustaining procedures. Still others point out that certain comatose patients who were once diagnosed as brain-dead and terminal have, in exceptional cases, recovered; thus, the possibility of misdiagnosis or of miraculous recovery always looms on the horizon. Finally, some physicians point out that the Hippocratic oath states: "To please no one will I prescribe a deadly drug, or give advice which may cause his death." Ending someone's life, for whatever reason, requires that a physician corrupt the traditional practice of medicine, transforming it from an enterprise that helps and saves lives into one that harms and terminates them. Yet, in at least one legal brief, the American Medical Association, while opposing physician-assisted suicide, conceded that physicians face a dilemma in many terminal situations: "For over 2000 years, the predominant responsibility of the physician has not been to preserve life at all costs but to serve the patient's needs while respecting the patient's autonomy and dignity."

—John Seery

See also Death, Death with Dignity

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World Federation of Right to Die Societies, http://www.worldrtd.net/

RITALIN

Ritalin (methylphenidate hydrochloride) is a central nervous system (CNS) stimulant medication most commonly prescribed for children and adults diagnosed with attention deficit hyperactivity disorder (ADHD). Ritalin is also occasionally prescribed to treat sleep disorders such as narcolepsy. Ritalin was the first of many stimulant and nonstimulant medications that emerged for treating ADHD and is still the most widely used today, although other prescription drugs are increasing in popularity. Other similar medications used for ADHD include (in order of their appearance on the market) Dexedrine, Adderall, Desoxyn, and Cylert. The alarming 600% increase in the prescription of Ritalin since 1990 has created healthy debates about whether the drug is overprescribed. Each day, nearly 3 million children take Ritalin in the United States.

Although the specific mechanisms through which Ritalin has its effects are not fully known, it appears to temporarily increase the release of dopamine and, to a lesser extent, serotonin (both neurotransmitters) in key parts of the brain involved with behavioral and attention control and regulation, such as the prefrontal cortex. Ritalin is generally fast-acting (behavioral changes are often noticed within 15–30 minutes after ingestion), short-term in nature (effects typically disappear with 4 hours), and quick to leave the body, although slower-acting, sustained-release forms of Ritalin are now available.

Ritalin's popularity is related to the fact that "it works"; however, it is important to understand what "it works" means. Children with ADHD typically have trouble with three aspects of behavioral self-regulation: attention, impulsivity, and hyperactivity. For some children diagnosed with ADHD (about 70%), Ritalin helps them sustain their attention longer on difficult tasks, resist external distractions, sit still longer, follow directions better, and wait their turn better to a degree that is noticeable by parents and teachers. Improvements are also often seen in increased prosocial behavior and reduced oppositional and aggressive behavior. It is important to note that these dramatic effects are short-term (while the medication is active), are not found in all children with ADHD, and can be found for nondiagnosed children as well. Ritalin appears to have minimal long-term effects, however, but this has not been fully established. For these reasons, and the fact that Ritalin does not directly address the other interpersonal, emotional, family, and motivational difficulties often present in those with ADHD, Ritalin should only be used in the context of a comprehensive treatment package that could include other intervention strategies, such as skills training, behavior modification programs, parent training and support programs, educational accommodations, and counseling/therapy as needed. The first three of the other treatment strategies listed above have been shown to be as effective as Ritalin.

Despite its numerous benefits and the critical difference it has made in normalizing the lives of many families with ADHD children, Ritalin does not come without costs/risks. In addition to the extremely rare but occasional idiosyncratic adverse reactions to the medication (tic disorders, convulsions, visual disturbances, panic attacks, irregular heart beat), a sizable minority of users report a variety of side effects from Ritalin, including nervousness, insomnia, headache, nausea/stomach upset, and reduced appetite. Sometimes these problems can be alleviated by modifying the dosage and/or scheduling of the medication. Another common concern is slowed growth rate. In order to avoid this side effect, most recommend implementing "drug holidays"—periods such as weekends, summers,

and other breaks from school when Ritalin is not used. Finally, most researchers recommend that Ritalin (and related medications) not be used with children under the age of 6, not only because the side effects tend to be worse with the very young, but also because research on the short- and long-term effects of its use in very young children is lacking.

—Erin McClaren and Adam Winsler

See also Attention, Attention Deficit Hyperactivity Disorder (ADHD), Attention Span

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ROGERS, CARL (1902–1987)

Carl Ransom Rogers, an American psychologist born in Oak Park, Illinois, is recognized as one of the most influential individuals in psychology. Rogers's most important achievements include crafting a humanistic approach of psychotherapy known as client-centered therapy and initiating scientific investigation of psychotherapy, prompting some to call him the "father of psychotherapy research."

Rogers's parents devoutly ascribed to the beliefs of fundamentalist Protestantism and accordingly encouraged pragmatic and Christian values. Rogers entered the University of Wisconsin to study agricultural science; however, following an influential trip to China, his interests shifted from practical pursuits to intellectual ones. Rogers received a BA degree in history and entered the Union Theological Seminary in New York City before transferring to Columbia University Teacher's College to study clinical psychology.

While at Columbia, Rogers specialized in the treatment of children. Roger's dissertation, *Measuring Personality Adjustment in Children Nine to Thirteen Years of Age* (1931), offered an objective test of children's attitudes toward their abilities and relationships. In his first book, *The Clinical Treatment of the Problem Child* (1939), Rogers critiqued the major approaches of psychotherapy and presented original thoughts concerning psychotherapist skills that would later become fundamental concepts of client-centered therapy.

Client-centered therapy was inadvertently born in 1940 when Rogers delivered a presentation at the University of Minnesota. Soon after, Rogers wrote *Counseling and Psychotherapy: Newer Concepts in Practice* (1942), which emphasized the use of humanistic principles in psychotherapy. Rogers referred to this new approach as "nondirective." The nature of nondirective psychotherapy greatly contrasted the dominant approaches of behaviorism and Sigmund Freud's psychoanalysis. Like many groundbreaking achievements, nondirective techniques were initially ignored, then met with heated criticism.

In 1945, Rogers left a professorship at The Ohio State University to direct a new counseling center at the University of Chicago. The counseling center was conducive to the cultivation of nondirective techniques, and in 1951 Rogers published *Client-Centered Therapy.* Rogers asserted that client-centered therapy empowers clients to achieve greater self-understanding through the therapist's ability to employ unconditional positive regard, empathy, and genuineness. Much of Rogers' subsequent work sought to refine and promote client-centered therapy, as well as supporting its efficacy by conducting controlled outcome research. Late in his career, Rogers addressed the fields of education and conflict resolution. Rogers published 16 books and more than 200 articles. The American Psychological Association awarded Rogers the first Distinguished Scientific Achievement Award (1956)

and the first Distinguished Professional Contribution Award (1972).

—Shawn T. Bubany

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ROGERS, FRED (1928–2003)

Fred McFeely Rogers was born March 20, 1928, in Latrobe, Pennsylvania, 40 miles east of Pittsburgh. The son of wealthy and devout Presbyterian parents, he earned his bachelor's degree in music from Rollins College (Winter Park, Florida, 1951) and was hired by NBC television in New York to assistant produce *The Voice of Firestone* and, later, floor direct *The Lucky Strike Hit Parade, The Kate Smith Hour,* and the *NBC Opera Theatre*. He married (Sara) Joanne Byrd, Rollins classmate and concert pianist, in 1952, and in November 1953 they returned to Pittsburgh and Western Pennsylvania roots. WQED Pittsburgh, the nation's first community-sponsored educational television station, was preparing to air and had asked Rogers to develop its program schedule. One of his first productions was *The Children's Corner*—hour-long music and puppetry—in which Rogers was off-camera as puppeteer, composer, and organist. It was here that puppets Daniel Striped Tiger, X the Owl, King Friday XIII, Henrietta Pussycat, and Lady Elaine Fairchilde were born and first aired.

Beyond his WQED responsibilities, Rogers attended Pittsburgh Theological Seminary and the University of Pittsburgh's Graduate School of Child Development, receiving his seminary degree and Presbyterian minister ordination in 1963. His ordination charge was to continue utilizing his talents to reach children and their families through the mass media. Later in 1963, CBC Canada asked him to create a children's program called *Mister Rogers*. In this series, Rogers debuted on camera as host and formulated the program elements for *Mister Rogers' Neighborhood*. The *Neighborhood* itself formally aired when Rogers and his family returned to Pittsburgh in 1966. It was distributed first through National Educational Television (NET), later to become the Public Broadcasting Service (PBS). Immediately winning the hearts and minds of children and their parents, the *Neighborhood* ran 33 years, becoming the longest running program for children. En route, Rogers himself received every conceivable honor the nation could accord him, including two Peabody Awards, four Emmys, a "Lifetime Achievement" Award from the National Academy of Television Arts and Sciences, induction into the Television Hall of Fame, a star on the Hollywood Walk of Fame, and the Presidential Medal of Freedom, the nation's highest civilian honor. One of his mother's home-knit red cardigan sweaters hangs in the Smithsonian Institution's Americana Collection in Washington, DC.

As "media parent" to generations of children, Rogers and *Mister Rogers' Neighborhood* identified with children's feelings and experiences; talked with children about difficult topics such as divorce, conflict, adoption, and death; assured children that they were special and that there was no one in the world just like them; and welcomed young viewers to a trolley ride into the "The Neighborhood of Make-Believe." Rogers personified acceptance, love, and caring. A private person who never sought the spotlight, his noblest goal was to be someone who cared deeply about children. When a symposium on creativity and childhood was convened in his honor, bringing together the nation's distinguished academicians and keynoted by Erik Erikson, it seemed crystal clear that Rogers' goal had been realized.

After a December diagnosis and January treatment for stomach cancer, Rogers died at his home in Pittsburgh on February 27, 2003, survived by his wife, (Sara) Joanne, two sons, and two grandsons.

—Edward L. Palmer

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RUBELLA (GERMAN MEASLES)

RUBELLA VIRUS AND CONGENITAL RUBELLA SYNDROME

Rubella virus causes a benign disease known as "rubella" or "German measles." The primary symptoms associated with rubella are low-grade fever, enlarged lymph nodes, and rash, and these usually resolve within 3 days of appearance (leading to another name for the infection, "three day measles"). Rubella virus infection is frequently unapparent. The virus is spread by the respiratory route (sneezing and coughing releasing virus present in saliva) and once contracted it establishes a bodywide or systemic infection. An immune response is induced by the infection, which clears the virus and establishes effective lifelong immunity against reinfection. Despite the names attached to rubella virus infection, the virus is distinct and unrelated to measles virus, and as an acute disease, measles is more serious than is rubella.

The serious complication associated with rubella virus infection arises when infection occurs during the first trimester of pregnancy. The systemic nature of the infection allows the virus to reach the placenta where it replicates and crosses the placenta leading to infection of the fetus. The consequences of fetal infection range from fetal death to induction of congenital defects, although fetal infection without consequences does occur. Congenital defects most commonly include deafness, blindness, mental retardation, cardiac malformations, and thrombocytopenia purpura. The latter is a platelet defect that leads to appearance of petechiae or blue spots on the skin, known as "blueberry muffin syndrome," which, when present at birth, is indicative of fetal rubella virus infection. The constellation of defects caused by fetal rubella virus infection is known as "congenital rubella syndrome" or CRS. CRS can be manifested as a single defect or several of these defects, and the most affected CRS patients are severely handicapped and may require institutionalization. The CRS epidemic in 1964 and its aftermath were a major impetus behind proposal and passage of the Children with Disabilities Act by Congress in 1973.

The mechanism by which fetal rubella virus infection leads to CRS is not known. Fetal infection is widespread, affecting all tissues and organs, and CRS patients shed virus for up to a year after birth; however, little frank damage and no immune-mediated tissue destruction is detected. A hallmark of CRS is that small stature and affected organs often have a reduced number of cells. Considering that the critical window for CRS is early in gestation, it is thought that virus infection of progenitor cells may interfere with organ and tissue development. The chances of CRS occurrence following fetal infection are greatest during the first month of gestation, decline during the second and third month, and are nonexistent after the four month.

The link between rubella virus infection during pregnancy and birth defects was first recognized in 1941 by an Australian ophthalmologist, N. M. Gregg, who reportedly heard mothers of newborns in his waiting room commenting on a recent rubella outbreak and an increase in congenital cataracts. Rubella virus was not isolated until 1961. A worldwide pandemic occurred in 1964 leading to over 20,000 CRS cases in the United States. The pandemic spurred the development of live, attenuated vaccines, which were approved and in use in vaccination programs by 1969. Application of the vaccination program has been progressively tightened since introduction of the vaccine, and at present (2005) indigenous rubella has been eliminated from the United States and the small number of cases that occur are imported. Current vaccination requirements in the United States are two doses, one given at 15 to 18 months of age and a second at 4 to 6 years of age. The vaccine is routinely administered as a component of a trivalent vaccine consisting of the live attenuated measles, mumps, and rubella vaccines, known as MMR. Vaccination is enforced as a requirement for primary school and university entry and, in some states, for obtaining a marriage license. In some places, entry into health care (positions in which contact with women in early pregnancy could occur) requires adults to be vaccinated against rubella.

Once fetal infection occurs, there is no intervention available that can alter the course of infection or prevent development of CRS. A woman contracting rubella during the early course of pregnancy is confronted with a definite probability, though not certainty, that her baby will suffer from CRS and the

wide range of defects that it presents. Tests to detect the presence of virus or anti-rubella virus fetal antibodies in amniotic or chorionic villous specimens to confirm fetal infection have been developed, but these are not routinely available in the United States because of the infrequency of rubella during pregnancy. Thus, the only options are delivery or termination of the pregnancy. Rubella virus infection during pregnancy is therefore prevented by aggressive national administration of the MMR vaccination program and testing for immunity to rubella virus during prepregnancy counseling. Women found to be nonimmune are vaccinated if not pregnant and vaccinated postpartum if already pregnant. Through implementation of these procedures, the occurrence of CRS is extremely rare in the United States.

—Teryl Frey

See also Teratogen

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S

School

I have never let my schooling interfere with my education.

—Mark Twain (1835–1910)

SAMPLING

Research studies typically include a sample group that is presumed to represent a larger population. For example, if the researcher is interested in the understanding of friendship during middle childhood, it is impossible to test all children in that age group. Instead, the researcher tests a sample of children in that age range and, if the sample adequately represents the broader population, then the results of the study may generalize from the sample to the population. Therefore, the sample refers to the specific people or cases that are studied, and the population refers to the entire set of people or cases that the researcher aims to describe.

Researchers should address whether their sample is representative of the larger population and should attend to possible sources of bias in sampling. Randomization in the sampling procedure helps avoid bias in sample selection. Two examples of randomized sampling techniques are simple random sampling and stratified random sampling.

In simple random sampling, each member of the population has an equal chance of being selected for inclusion in the study. Selection is done through a process that is truly random, such as the use of a computerized random number generator. For example, if a company wanted to interview a simple random sample of 10% of its employees, it might assign code numbers to each employee and then use a computer-programmed randomized selection process to choose 10% of the employees by code number.

In this case, the process used would be sampling without replacement, because once that employee's code was chosen, that code would not be put back into the pool of available numbers to select. A different method, sampling with replacement, would be useful in other circumstances and would involve replacing the selected number in the pool, so that it could potentially be selected again.

Stratified random sampling is used when the researcher wants representation from various subgroups, or strata, within a population. For example, in a study of parenting, a researcher might deem it important to include categories defined as parents of one child, parents of two children, and parents of three or more children. Within the available population of parents, the researcher would randomly select a sample of parents in each subgroup.

In studies that are based solely on volunteer participants, the results may generalize to a greater population

of those who would volunteer, but may not generalize to the general population. The issue of nonresponse bias is a factor here, because those who choose not to volunteer for the study might differ in critical ways from those who choose to volunteer. Survey research is an example of a type of study where nonresponse bias is a concern.

In many studies in the behavioral sciences, true random sampling is not possible. For example, a researcher interested in studying children's moral development cannot sample randomly from all children of a certain age in some geographic area. Typically, the researcher may be working with certain schools and, within those groups, can test only those children whose parents give informed consent to the experimental procedure. Therefore, even if the researcher takes a random sample of the total group of children whose parents consented within two neighborhood schools, that sample is not necessarily representative of the entire population of children of that age. In addition to potential differences between children whose parents agree to have them participate and children whose parents do not agree, the schools may differ from the broader population of the area in terms of socioeconomic status, race and ethnicity of the students, and other factors. Large-scale, national studies of day care, for example, should address issues of sampling and potential sources of selection bias. In many behavioral science studies, researchers make the best attempt they can to provide a reasonable sample that meets the purposes of their study and minimizes sources of bias.

—Marie T. Balaban

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SAT

The College Board Scholastic Aptitude Test (SAT) was first administered in 1926 to more than 8,000 candidates to colleges in the northeastern section of the United States. The first SAT was a multiple-choice examination consisting of nine subtests: definitions, arithmetical problems, classification, artificial language, antonyms, number series, analogies, logical inference, and paragraph reading. In subsequent years the number of subtests was reduced to six. Later the SAT was divided into two separate sections: one section dealing with mathematical ability and the other dealing with verbal ability. With minor modifications, the SAT remains a test of verbal and mathematical abilities much as it had been developed earlier.

The SAT is neither an intelligence test per se nor an educational achievement test, but a mixture of both. The verbal scale of the SAT is basically vocabulary and reading comprehension and, by implication, an index of student facility in linguistic concepts and expression. The mathematical scale is basically a measure of the student's ability to deal with numerical symbols, analyze quantitative relationships, and interpret mathematical problems. In this manner the SAT is a measure of the student's ability to analyze and interpret written materials of the kind encountered in academic coursework. The specific nature of the items, of course, were antonyms, analogies, sentence completions, and paragraph comprehension on the verbal scale and arithmetical computation on the mathematical scale. No total or combined score is reported for the SAT because it is not thought desirable to summate the two scores. Indeed, the verbal scale has the backing of the trivium (rhetoric, grammar, and logic) and the mathematics scale is representative of the quadrivium (astronomy, geometry, music, and arithmetic) in the curriculum of the medieval university. As indicated by the president of Educational Testing Service in his annual report of 1961–1962, the SAT is "quite simply a highly reliable measure of verbal and mathematical ability" and "as such it serves both students and colleges well."

An extensive study of the SAT in 1974 showed that the SAT is indeed useful to both students and colleges. Thirteen years of data from the University System of Georgia norms booklets were analyzed on the premise that the value of the SAT did not lie in its ability to directly and independently predict college performance,

but in its incremental effectiveness when used in conjunction with high school records. In other words, the College Board has long advised against the use of the SAT as a single, absolute measure of academic ability and has consistently recommended that the SAT be used in conjunction with other information such as high school records and achievement test scores. The Board has also pointed out that the high school grade point average (HSA) or class rank is the best single predictor of college grades and that the advantage of using the SAT is as a supplement to HSA or other indications of prior educational achievement.

Uses of the SAT have often combined HSAs and SAT scores as multiple predictors of freshman grade point averages. The relative contributions of SAT verbal and SAT mathematic scores vary, of course, from institution to institution. In the University System of Georgia, statistical analysis reveals that the SAT verbal score contributed significantly to the prediction of freshman grades 70% to 80% of the time, while the SAT mathematics score contributed approximately 50% of the time. Both the SAT verbal and the SAT math scores contributed 30% to 40% of the time. Only in approximately 10% of cases did neither the verbal nor the mathematics scores contribute significantly to the prediction of freshman grades.

The analysis of SAT scores over a 13-year period suggested that the public colleges and universities of Georgia could be classified by the mean SAT verbal scores recorded over the years. The university-level institutions consistently had a mean SAT verbal score of 450 or higher, while the 4-year senior colleges had an SAT verbal score between 400 and 450 and the junior or 2-year colleges in the state had a mean verbal score somewhere between 300 and 400. The level of the SAT verbal scores, however, was not related to the extent to which they correlated with college grades. For example, the SAT verbal score of men correlated .36 with grades in junior colleges, .37 with senior college grades, and .35 with university-level grades. Correlations for women were .50, .53, and .45, respectively.

The study consistently showed that a combination of SAT scores and HSA provided the best prediction of college grades. The data also showed that there was some slight loss in predictive efficiency whenever SAT scores were combined prior to their insertion in a regression equation. Multiple correlation coefficients with a differential weighting of SAT-verbal + SAT-math + HSA were .58 for male students and .70 for female students during the years studied. There were no detectable differences among the three levels of institutions for either men or women.

The predictive efficiency of the SAT was demonstrated by computing an index of forecasting efficiency for the HSA alone and then computing an index of forecasting efficiency for the combination of HSAs and SAT scores. The average gain found in this manner was 6 percentage points for men and 8 percentage points for women. The researcher concluded from the study that the use of the SAT reduced the predictive error an additional 6 points (or 46%) for male students and an additional 8 points (or 43%) for female students.

The study concluded that while the predictive efficiency of the SAT had been amply demonstrated, the use of the SAT should not be based on the increased accuracy of predicted grades alone. There were many indications that numerous benefits had accrued from the use of the SAT over the 13-year period. The norms booklets distributed annually by the University System of Georgia depicted the diversity of institutions within the System and the differential attraction of students with varying levels of high school preparation and measured ability. The normative data gave high school counselors accurate and reliable information about the various institutions of the University System. In turn, the data contained in the norms booklets gave high school seniors appreciable information about the relative difficulty of academic success in the public institutions of Georgia.

The SAT was originally conceived as a measure of academic ability that would be relatively independent of high school preparation, teacher judgments, and HSA. Its primary use over the years has been the prediction of freshman grades and selective admissions to institutions with more applicants than classroom facilities. As the best known and most widely used standardized test of academic ability, the SAT is the frequent target of critics who believe that all standardized tests impede access and equity for students who are socially, economically, or educationally disadvantaged. Ignored in most criticisms is the valuable information that the SAT has provided about the verbal and mathematical abilities of students completing secondary education and entering U.S. colleges and universities.

In many respects the SAT remains a major source of information concerning the abilities and preparation of college students, the general or overall quality

of secondary education, and the extension of educational opportunity to minorities in a pluralistic society. Other admission tests, such as the American College Test (ACT), also contribute significant and valuable information, but the SAT is more frequently discussed in matters of national or public policy. Indeed, the SAT is much closer to being, in effect, a national or public examination for students leaving secondary schools and entering institutions of higher education.

The uses and consequences of the SAT and other standardized tests in the United States continue to be involved in more significant issues concerning access, equity, assessment, and accountability in higher education. During the 1980s, criticisms of standardized tests focused more directly on the assessment of educational outcomes. Assessment has been advocated as more appropriate for purposes of accountability and accreditation, and different forms and methods of assessing (as opposed to testing) student performance were part of the public demands placed on schools and colleges. Unfortunately, criticisms of the SAT were often confused. Declining SAT scores were interpreted as evidence of the SAT's irrelevance to educational decisions, and variations in predictive validity coefficients were interpreted as proof of the SAT's technical obsolescence. Changes in the SAT's content were recommended by the SAT's more friendly critics, while complete abolishment was advocated by those who saw no merits in either national testing agencies or their standardized products.

Thus, we witness the continuing national concern over access-and-equity issues in higher education and the public demands for accountability that stem from perceptions of declining quality. The continuing interplay between a periodic quest for "social justice"—as reflected in educational opportunities and outcomes—and the public's interest in assessment as a means of accountability is a fascinating example of differences in national perceptions and expectations. Whatever the American national character, it has often been depicted as "quite willing to enjoy the best of all promising alternatives."

American notions of equity stem from a long-standing concern with proportionate sharing. Regions, states, counties, and cities in the United States have often based their public expectations on concepts of "democratic arithmetic." Reading in the newspaper that a certain percentage of the nation's population resides within their state, citizens and residents may assume that they are entitled to a similar percentage of the nation's many benefits, advantages, and amenities. Such reasoning was quite pronounced in regional studies of the southern states during the 1930s and in the civil rights movement of the 1960s. Constituting a substantial percentage of the nation's population, minority citizens understandably believe that they are entitled to a more equitable percentage of the rights and privileges in which societal distribution is influenced by public policy.

As other minority groups became aware of their proportionate share of societal benefits and advantages, more frequent references were made to "distributive justice" and institutions of higher education were increasingly perceived as the means by which such "national objectives" were attained. In much the same manner, national security has dictated federal aid to education in the name of national defense.

In the late 1950s and early 1960s, as college enrollments expanded, selective admissions was momentarily regarded as a solution to limited facilities, faculties, and finances. The College Board took the lead in addressing the policy issues involved in limiting enrollments to accommodate institutional resources. Annual symposia, research conferences, professional journals, and the popular press demonstrated a remarkable consensus in their discussions of "an impending tidal wave" of students and the nation's needs for campus facilities and classroom instructors.

The individualistic features of the American national character have also included the expectation that individuals should excel. The discovery and development of talent was a particularly appealing aspect of higher education in its post–World War II years, and as school and college enrollments benefited from a rapidly increasing birthrate, the sifting and sorting of potential talent was a societal responsibility that colleges and universities managed well until overwhelmed in the late 1960s. Jeffersonian notions of a "natural aristocracy of virtue and talent" were quite compatible with the nation's faith in education, and the testing of student aptitudes, abilities, and interests was in keeping with the public interest.

John Gardner's (1961) book on excellence was read as both a national and a personal challenge. Individual differences in athletics, music, art, and drama were widely recognized as natural talents that could be identified early and developed further. Creativity and ingenuity in science and other intellectual disciplines were increasingly recognized as

special talents that should be discovered and encouraged. An emerging concept of developed abilities (such as those measured by the SAT) promised to set aside the irreconcilable differences of hereditarian and environmentalistic doctrines, and serious efforts were made to measure educational progress as a rational and developmental sequence in intellectual and/or academic competence. The optimism of that day was short-lived.

In the late 1960s, national thought and discussion were mistakingly preoccupied with idealistic notions of social justice. On college campuses, student protests and faculty dissent produced an educational climate in which neither administrators, faculty, nor students could discuss access, equity, and excellence as complementary concepts without contradiction. In their quest for excellence, colleges and universities were regarded by social critics as serving the screening and credentialing needs of society, business corporations, and government agencies. For some critics, excellence became a code word for elitism and for the exclusion of minorities, women, and other nontraditional students.

In their quest for equality of educational opportunity, schools and colleges witnessed a drastic shift from educational inputs to educational outcomes. The U.S. Congress, unwisely writing into the Civil Rights Act of 1964 a survey of equal educational opportunity, created a demand for instant results that schools and colleges could not supply. In their hurry to meet a congressional mandate, the survey researchers were entrapped by their methodological preferences and concluded, for the most part, that further federal funding was a waste of public resources. Instead of surveying the "availability of equal educational opportunities for individuals by reason of race, color, religion, or national origin," the researchers analyzed the determinants of educational achievement as measured by tests of verbal ability. The major conclusion, as reported in the news media and as heard by too many receptive ears, was that home, family, and community were more important to student learning than school facilities, teachers, classmates, and textbooks. Reanalyses and reinterpretations eventually clarified the confusions of the massive data collected, but not before considerable damage had been done in the world of public opinion and public expectations.

In retrospect, the emergence of equity as a dominant feature in public notions of social (or educational) justice can be viewed as a poorly articulated progression from (a) public expectations of "equal educational opportunities" to (b) strident demands for "equal educational outcomes." From there, public thought and discussion turned to (c) concepts of "equity" in educational opportunities and outcomes and eventually to (d) more realistic concepts of equity as "fairness" in educational access, placement, instruction, evaluation, progression, graduation, and societal benefits or advantages. Concepts of equity as fairness are more in keeping with current concepts of cultural pluralism and give better promise to the future solution of educational problems. Unfortunately, the roadside is still cluttered with the debris of sociological and econometric notions of distributive effects that replaced a constructive "psychology of individual differences" with a militant "sociology of groups." In the process, many schools and colleges found that they could not serve as instruments of worthy public policies without becoming political playgrounds.

In 1994, the Scholastic Aptitude Test was renamed the Scholastic Assessment Test. The change in name was in keeping with a national interest in the assessment of educational outcomes that was clearly evident in the 1980s. Given the nation's previous reliance on testing, measurement, and evaluation—as funded by federal legislation—it is not surprising that the assessment of student outcomes should be widely advocated. National commissions and public leaders were apparently convinced that institutions of higher education could not be accountable without better evidence of congruence between institutional purposes and institutional effectiveness. Despite the inordinate concern with distributive effect in sociological and economic studies of occupational placement, starting salaries, lifetime earnings, socioeconomic status, and professional prestige, many studies were sensitive to the individual abilities of students and graduates as they climbed national career ladders. Some studies were explicit in their recognition that "sophisticated notions" of social origins and socioeconomic status could not account for the distributed benefits of education, occupation, and income without including individual achievement and abilities.

The "assessment movement" of the 1980s was a function of the changing climate of public opinion in which institutions of higher education found themselves. A quarter century of declining test scores, the necessity of teaching basic skills of literacy to thousands of college freshmen, and intense dissatisfaction with the general academic competencies of a large proportion of college students—plus embarrassing

criticisms of the literacy of college graduates enrolled in professional or graduate programs—have convinced many public leaders and policy makers that outcomes assessment is necessary to ensure institutional and program effectiveness and accountability to societal benefactors and sponsors.

Current assessment concepts and methods have been influenced by the minimal competency testing movement of the 1970s, the many debates concerning criterion-referenced and norms-referenced testing, and the nation's apparent love-hate relationship with multiple-choice, mechanically scored, computer-processed tests such as the SAT. The U.S. news media, unable to accept the SAT as an empirically developed measure of verbal and mathematical ability and refusing to view standardized testing as a necessary technological innovation in an era of mass education, continued to give headlines to studies that hint at Achilleian heels.

Although interesting methods of assessment are continually sought, genuine, substantive assessment of general (and meaningful) educational outcomes is unlikely until national testing agencies supply "an assessment market" with instruments and methods that will have the practicality, credibility, and fairness of traditional and/or empirically validated tests of the SAT and ACT.

The assessment uses of the SAT are demonstrated best by the useful information it and similar standardized tests provide about student abilities and achievement. No other national organizations serve the public interest in the same way that the College Board, Educational Testing Service, and the American College Testing Program do. Critics of the SAT seldom recognize that the intellectual development of individuals is still an essential purpose and function of higher education. Intellectual competence is still an expected outcome of a college education, and the SAT—with such tests as the Graduate Record Exam (GRE), Law School Admission Test (LSAT), and Medical College Admission Test (MCAT), among others—is still the best measure we have of the intellectual/academic competencies needed in various fields of advanced, specialized, professional study. The verbal and mathematical abilities tapped by the SAT are still the best (general) indication of individual capabilities in the world of education. And intellectual ability is still the best generalized measure of individual achievement. No one doubts individual differences in athletics, literature, music, and art, but too many social critics find it difficult to accept individual (and group) differences in intellectual development.

In addition to information about the abilities and achievements of individuals, the SAT provides relevant information about the distribution of student abilities among institutions and programs of higher education. Within statewide systems of public higher education, the distribution of students among institutions and programs is particularly relevant to many issues in public policy. In the University System of Georgia, the distribution of SAT scores among institutions lends credence to policy decisions that placed public institutions within commuting distance of the great majority (95%) of the state's population. Also implied by such distribution are the beneficial effects of individual choices and institutional decisions in the admission of high school graduates to the state's public colleges and universities.

The assessment uses and implications of the SAT may be summarized in the following manner: As a standardized test of academic ability, the SAT is, in many ways, a measure of basic academic competencies that are used extensively in undergraduate, graduate, and professional education. To no small extent, the test reflects the importance of vocabulary, reading comprehension, and mathematical reasoning in many different phases of conceptual learning. In addition to their usefulness as a general measure of intellectual/academic competence, SAT scores are often useful in advising, counseling, sectioning, and placing students who must choose institutions, programs, services, and activities. Also relevant are the SAT's many uses in institutional research, planning, development, and evaluation that may affect future decisions and choices.

In the long-term advancement of standardized tests and their educational uses, the misuses of the SAT have been dramatically publicized. In 1983, when the National Commission on Excellence in Education issued its report, *A Nation at Risk*, the SAT was used to "rank" the 50 states of the nation. Since that time, the news media have continued to regard the quality of secondary education as a function of SAT scores, as released for publication. To a certain extent, the SAT became the victim of its reputation as a national examination of educational progress. It also became the most visible target in what some regard as "the testing wars" enemy. The SAT, perhaps more than any other nationally administered test, has contributed significantly to the clarification of public policies

concerning access and equity. The policy issues concerning standardized tests, group differences, and assessment alternatives to traditional testing concepts involved, in many ways, data and information derived from the SAT or similar tests. For such reasons, the SAT, similar tests, or their modified versions should be used much more extensively in the assessment of educational outcomes—not less!

In the 21st century, the assessment of educational outcomes is, or should be, a search for competence—not excellence. Governing boards and other public officials demand assurances that high school graduates can read and write well enough to become responsible employees, voters, and taxpayers. Social justice, whatever its form, requires that educational opportunities be accessible and that educational outcomes be equitable. The public interest requires better secondary preparation to ensure basic academic competencies that will permit high school graduates to take better advantage of postsecondary opportunities. Thus, it all suggests a remarkable convergence on one form or another of assessment and achievement.

In the assessment of educational outcomes, individual differences will continue to be the major source of variance on the SAT, ACT, and other standardized tests. Neither institutional or program characteristics nor instructional facilities and methods will account for measured or assessed outcomes, or for the intellectual/academic development of individual students. The assessment of educational outcomes thus cannot be statistically significant, educationally meaningful, or publicly creditable without consideration of individual differences in academic or learning ability.

Clearly, the public interest is best served in a society where individual talents, abilities, and achievements are assessed in a fair and creditable manner. Given systematic, objective, valid, reliable, and fair assessments of educational outcomes, individuals and institutions in higher education should be the beneficiaries. Assessed outcomes should serve the public interest in both accountability and accreditation, as well as institutional interests in the improvement of undergraduate education and student development. The assessment of individual competencies should serve social justice by contributing more substantially to self-understanding, academic and career planning, and personal management.

If we seriously ask how effective the SAT has been in facilitating the decisions institutions must make in selectively admitting students—or how helpful SAT scores might be in the choices of students actively recruited—we can turn again to the experiences of the University System of Georgia where SAT scores have been required since 1957 for all students entering its 34 institutions of higher education.

As the nation's fourth-largest statewide system of public higher education, the University System of Georgia has an excellent database from which SAT scores, HSAs, and first-year college grade point averages (GPAs) have been intensively studied. Even more important is the attention that the University System has given to the distribution and organization of its institutions—geographically, regionally, and economically—and to public expectations for diversity, access, and equity. As the largest state (territorially) east of the Mississippi River, Georgia now has a statewide system that has attracted the interest of other states.

In 1986, a more thorough study of the University System of Georgia's cumulative experience with the SAT gave commendable support to its use in admissions, counseling, and overall assessment. This study has involved more than 243,000 students entering units of the University System of Georgia over a 25-year period and consists of at least 883 different regression equations in which HSAs, SAT-verbal, SAT-math, and GPA have been correlated. Because of the large number of subjects involved in the study and because of the large number of equations, there is little observed variance in the mean correlations computed over the 25 years. The analysis shows that almost 41% of the variance in academic achievement by female students in the freshman year can be accounted for by prior preparation in high school and by verbal and mathematical abilities, as measured by the SAT. For male students, the differential weighting of SAT scores and HSAs can account for almost 34% of the variance in freshman grades. Such analysis of SAT scores and HSAs suggests that approximately 60% of the variance in freshman grades for women remain unaccounted for while approximately 64% of the variance in freshman grades for men is similarly unexplained. Thus the conclusion many years ago that we can predict freshman grades as well as we should hope to do so is justified. The unexplained variance of freshman performance—all educators should trust—can be accounted for by such conditions as student effort and quality of instruction.

In brief, the SAT, as a measure of verbal and mathematical abilities and as an indication of the

applicant's readiness to meet academic responsibilities, finds many uses in the units of the University System of Georgia. Users of the SAT are familiar with the test and know of its long use within the University System. The most important conclusion to be drawn, however, is that the SAT is valuable in the articulation of students from secondary schools to units of the statewide system of public higher education. Continued use of the SAT in the University System of Georgia has never been justified on the basis of its predictive validity alone, but on the basis of the valuable information the SAT provides about student abilities and achievement.

Currently, the semantic differences between *assessment* and *achievement* are much in evidence. Critics of the SAT Assessment Test advocate the use of SAT Achievement Tests. Their opponents believe this to be unwise—and perhaps a naive effort to develop tests less susceptible to coaching (by entrepreneurial programs that many parents cannot afford for their sons and daughters). From other critics, and in the name of accountability, comes the insistence of the news media in publishing annual rankings of the 50 states—based on state averages of SAT scores and nothing else. Treated as a "national" report card on how well our secondary schools prepare their graduates for higher education, such "reports" mislead their readers into thinking the states with very low college attendance do a better job of preparing students for college than states with higher in-state college attendance.

Whatever the title of the SAT—be it aptitude, ability, assessment, or achievement—the original purpose of the SAT was to assist selective institutions in their decisions to admit individuals, and to help individuals in their choice of colleges and/or universities to attend. Intelligent uses of the SAT have always implied that SAT scores were valuable information to use in conjunction with other valid and reliable information in making a decision to admit (on the institution's part) and in making a choice to attend. High school counselors, if competent, have always used other sources of information in making recommendations to students—and surely, student advisors continue to use other resources in recommending college programs, services, and activities.

—Cameron Fincher

See also Standardized Testing

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SCAFFOLDING

Scaffolding occurs during the activities adults and children engage in together every day. *Scaffolding* refers to a particular way in which adults help children learn or assume more responsibility for tasks. Experts in child development view scaffolding as an important process through which children acquire new skills and learn about their world. As the metaphor of scaffolding used in building construction suggests, the idea is that before children are able to stand on their own and complete tasks independently, adults (or more competent peers) provide just the right amount and type of support, assistance, or "scaffolding" children need in order to move to the next level or take on more responsibility for completing a particular task by themselves.

While the term *scaffolding* is not found in the original writings of Lev Vygotsky, the concept is based on his sociocultural theory of learning and development. Vygotsky and his followers believe that child development takes place via the internalization of cultural tools and by the child's increasing appropriation of adult-like roles and participation in cultural activities, not unlike how a student apprentice gradually learns from a master craftsman. Neo-Vygotskian scholars of the 1970s, such as David Wood and Jerome Bruner, began using the term to describe which teaching practices are most effective in promoting the cognitive development of children. Although typically used to refer to a quality of one-on-one adult-child interaction, the concept of scaffolding can also be applied to small-group and classroom teaching/learning processes.

The key features of scaffolding include (a) adult-child joint collaboration on a challenging and culturally meaningful problem-solving activity; (b) the presence of what is called *intersubjectivity*—when

both adult and child are trying to accomplish the same thing or share the same goals for the task; (c) the adult contingently adjusting the amount and type of assistance provided to be as minimal as possible, depending on the child's moment-to-moment competence with the task; and (d) an active attempt by the adult to sensitively withdraw his or her assistance as the child's skills increase over time to allow the child as much autonomy as possible. The main goal for the adult who is scaffolding children's problem solving is to keep the level of task difficulty within the child's zone of proximal development—that is, slightly above the level of difficulty at which the child could complete the task independently but still within the range where the child could succeed on the task with some adult assistance. Good scaffolders typically do this by what is called *contingent shifting*—they shift the amount and type of support provided contingent on the child's current success, increasing support when a child is struggling and reducing support when the child does well on the task. Finally, scaffolding is often more successful when it occurs within the context of warm and pleasant interactions and secure relationships between adult and child.

Although the general processes involved in scaffolding appear to be culturally universal, the particular way in which adults scaffold children's learning varies somewhat across cultures. Some cultural groups—for example, when engaging their children in apprenticeship learning situations—use more demonstration and modeling techniques and less overt verbal discussion with children about the activity.

Research shows that scaffolding is not only an effective way for children to learn specific tasks, but it also promotes cognitive, language, motivational, and social-emotional development more generally in important ways. After a good quality scaffolding session, children walk away with not only increased competence on the task they were working on, but also an increased sense of mastery, self-efficacy, task enjoyment, and task persistence, as well as new ideas about how to plan and organize one's problem solving and how to work together with others.

—Erin Way and Adam Winsler

See also Vygotsky, Lev

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SCHEMA

Starting as early as infancy, children have expectations about their environment, or schemata, which enables them to recognize and understand recurring themes in their daily world. Thus, schemata are mental shortcuts that help people make predictions about the world. These mental shortcuts are derived from experience (often repeated) with specific events. For example, children may develop a schema for attending school, a trip to the zoo, or dining out after one or more experiences with these events. Without schemata, each interaction with an environment (e.g., school) would be like the first time. Developmentally, schemata are believed to be one of the earliest forms of knowledge representations, and are established easily by children. Although repeated exposure to an event strengthens a schema, children can form schemata after a single exposure to an event. Schemata are recognized as important mental processes that develop in early childhood and affect almost every aspect of behavior.

SCHEMATA AND MEMORY

Schemata guide both interactions with new experiences and also later retrieval of information.

Information stored in memory has been conceptualized as being organized around schematic networks. For example, a schematic network concerning a trip to McDonalds would consist of a cluster of items and events relevant to a "normal" trip to McDonalds (e.g., ordering, hamburgers). During acquisition and retrieval of an event, people will encode both schema-typical and schema-atypical details, but they will store the atypical items separately. Over time, memory for the atypical details fade, and the gaps are filled in with schema knowledge. In these cases, schemata can cause memory distortion.

TYPES OF SCHEMATIC KNOWLEDGE

The term *schema* is an umbrella category referring to generic knowledge structures of many types. Scripts are a specific type of schematic knowledge structure that reflects understanding of a temporal, repeated event, such as going to a restaurant or attending school. Stereotypes are another specific type of schema that refers to types and characteristics of people. Children have been found to have scripts and stereotypes at relatively young ages.

AGE DIFFERENCES IN SCHEMA USE

Preschool-aged children may rely more on general schema information when structuring their memory for familiar interactions than older children and adults. As a result, younger children have difficulty recalling information concerning a specific event. As young children develop a schema, until the schematic representation is an established mental framework, it is more difficult for the children to recall unique information about a specific event. As children age, their schemata become more solidified and they become more experienced with differentiating between information that is consistent with the general representation and information that is inconsistent with the general representation. Thus, older children rely less on their schemata to guide their memories than do younger children.

When children rely on their schemata when remembering, they are prone to making memory errors. For example, when children are presented with an event that contains information that is inconsistent with an existing schema, children remember the schema-inconsistent information when asked immediately following the event. However, as time passes between the event and the recall process, children rely more on their schema representations, causing them to remember the event as being schema consistent. Often this leads to a memory distortion for a specific episode in favor of the schema.

SUMMARY

In summary, schemata are useful because they make interacting with the world more predictable. Schematic knowledge, including scripts and stereotypes, is being acquired from infancy. Schematic information enhances memory when information is consistent with the schema but can cause memory errors when the to-be-remembered information is inconsistent with our expectations.

—Livia L. Gilstrap and Cindy Laub

See also Cognitive Development

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SCHIZOPHRENIA

Schizophrenia is perhaps the most complex, severe, and devastating of all mental illnesses. It can manifest in many different ways and forms. People with schizophrenia can exhibit, for example, a wide combination of psychotic symptoms, behavioral disorganization, and deficits in motivation and affective expression. Schizophrenic individuals may also show a variety of cognitive impairments. All of these symptoms interfere with the person's day-to-day social and occupational functioning. Schizophrenic signs and

symptoms typically wax and wane across time and circumstances. Some people with schizophrenia, for example, have periods of time when they think clearly and can function in the community, and other times when their thinking and speech become unclear, and they may lose touch with reality and require psychiatric hospitalization. In other cases, symptoms are refractory and severe enough to result in chronic impairment and major life disruption.

DIAGNOSTIC ORIGINS

In 1883, German psychiatrist Emil Kraepelin developed what is often considered the most comprehensive description of schizophrenia. He used the term *dementia praecox* to describe two important aspects of the disorder: an early onset, typically between 16 and 25 years old (praecox) and a progressive deteriorating course (dementia). Eugen Bleuer, a contemporary of Kraepelin, greatly broadened the definition of dementia praecox and renamed it schizophrenia, from the Greek words *schizein*, which means "to split," and *phrenos*, which means "mind." Bleuer believed that in schizophrenia, one's mental associations, thoughts, and emotions, which are usually integrated with one another, are loosened or split. Today, our conceptualization of the disorder (e.g., in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders,* 4th edition, or in the World Health Organization's *International Statistical Classification of Diseases and Related Health Problems,* 10th revision) is research based, more reliable and valid than in the past, and much closer to Kraepelin's description of dementia praecox even though the term *schizophrenia* was retained.

DESCRIPTIVE FEATURES

No single symptom is characteristic of schizophrenia. The diagnosis requires the presence of a number of behavioral and social deficits that significantly impact the functioning of the individual. Characteristic symptoms fall into three broad categories: positive symptoms, disorganized symptoms, and negative signs and symptoms. Positive symptoms reflect an excess of normal functions, such as delusions and hallucinations. *Delusions* are defined as beliefs that are both untrue and uncharacteristic of the individual's culture. They can be categorized as persecutory, somatic, referential, or grandiose. *Hallucinations* are sensory perceptions in the absence of an external stimulus, and can occur in any sensory modality—auditory, visual, tactile, olfactory, and gustatory. Auditory hallucinations are the most commonly experienced type of hallucination in schizophrenia and are perceived as one or more voices distinct from one's own thought. Disorganized symptoms include speech that is hard to follow and confused motor behavior. Speech may become so disorganized that the individual is almost incoherent and communication is severely impaired. Disorganized or catatonic motor behavior is exhibited in problems with goal-directed behavior, which lead to declining maintenance of activities of daily living as well as inappropriate and/or unpredictable behavior. Catatonic behavior occurs when an individual alternates between motor excitability and a decrease in reactivity to the environment. In extreme cases, the individual may assume an odd, rigid posture or even lose complete awareness of his or her surroundings.

Negative symptoms, in contrast, represent deficits in certain domains of normal functioning. They involve the absence of behaviors rather than the presence of behaviors and include affective flattening, which encompasses a diminished range of facial mobility and vocal expression; alogia, which is decreased fluency and productivity of speech; avolition, which involves the inability to initiate activities; and anhedonia, where the person loses the capacity to experience pleasure. Negative symptoms are more chronic and stable than other symptoms. Additionally it is believed that the severity of negative symptoms, particularly flat affect, is prognostic of a more severe and chronic course of illness.

CURRENT DIAGNOSTIC CRITERIA

Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision (*DSM-IV-TR*), criteria for a diagnosis of schizophrenia require that at least two of the characteristic symptoms listed above (i.e., positive, disorganized, and/or negative symptoms) be present for at least 1 month, or if the delusions are bizarre and the auditory hallucinations consist of more than one voice, then only one symptom is required.

In addition to the month of active symptoms, the *DSM-IV* diagnosis of schizophrenia requires significant dysfunction for at least 6 months in major areas of life functioning, such as self-care, work, or interpersonal

relations. Depending on the specific symptoms exhibited, schizophrenia can be categorized into several subtypes, such as paranoid, disorganized, catatonic, undifferentiated, and residual.

While cognitive impairment is not part of the formal diagnostic scheme for schizophrenia, many researchers advocate for its inclusion as a diagnostic criterion for the disorder. Cognitive dysfunction in schizophrenia is very common and can take the form of memory impairment, attentional dysfunction, and deficits in abstract reasoning and executive functioning ability. Cognitive deficits may play a major role in the social and occupational deficits exhibited by patients, and recent research suggests that cognitive deficits are a robust predictor of patients' outcome and treatment response.

Because there is such a wide range of manifestations of schizophrenia, differential diagnosis is also of great importance. Many positive and negative symptoms often associated with schizophrenia can occur in other disorders, such as depression, bipolar disorder, and acute substance intoxication. Psychotic symptoms, for example, can be exhibited during depressive episodes as well as manic episodes, and can be exacerbated by or even due to medical illnesses.

PREVALENCE AND DEMOGRAPHIC FACTORS

Schizophrenia affects about 1% of the general population. However, this figure differs depending on where the data were gathered. Schizophrenia is about eight times more common in poor individuals who come from inner-city environments. Some researchers suggest that the many stresses and lack of resources associated with poverty causes increased schizophrenia onset rates (social causation hypothesis). Other theorists speculate that many people with schizophrenia may start out at higher socioeconomic levels but due to schizophrenic illness wind up in the lowest social rungs (social drift hypothesis). It has also been speculated that the schizophrenic individuals found in poor urban areas are what is left after the people with the social and financial resources get out of the decaying neighborhoods (social residual hypothesis). Treatment outcome also varies, and affected individuals living in less stressful rural environments fare better than those people living in urban areas.

There are also gender differences in terms of the onset and prognosis. Women typically have a later onset than men. The age of onset of a first psychotic break in men is generally between the late teens and mid-twenties, while the age of onset for women is typically late twenties to mid-thirties. Onset before adolescence or after age 45 is possible, but relatively rare.

ETIOLOGY

It is indisputable that schizophrenia is, in part, genetically transmitted. First-degree relatives of people with schizophrenia, for example, have a 10 times higher risk for developing the disorder compared with the general population. Twin and adoption studies also support a genetic component to the disorder. Children of mothers with schizophrenia who were adopted away by families with no mental illness also have a 10 times higher risk for developing the disorder than adoptees without a biological parent with schizophrenia. Twin studies reveal that concordance rates are higher for monozygotic twins (about 50% concordance rates) than for dizygotic twins (10%–15% concordance).

The brains of some people with schizophrenia also show deficits in structure and function. Areas of the brain that have reliably shown impairment include the prefrontal cortex and mesolimbic areas. These regions control emotion, cognition, and social reasoning ability. Some studies also find that the ventricles of the brain, which are fluid-filled spaces, are enlarged in people with schizophrenia. This indicates deterioration in surrounding brain tissue.

In terms of neurochemical brain activity, the neurotransmitter dopamine appears to be too high in subcortical regions of the brain and too low in prefrontal brain areas. Further research has indicated that the neurotransmitters serotonin and glutamate may also play roles in the development and manifestation of schizophrenia.

Note that since concordance rates for monozygotic (identical) twins are not 100%, it is clear that nongenetic factors also contribute to the onset of the disorder. Some theorists hypothesize that a prenatal virus (e.g., influenza) affects the genetically susceptible fetus in the second or third trimester of pregnancy. Supporting evidence of immunodysfunction comes from studies that found that the people who were born during major flu epidemics of the 19th and 20th centuries have correspondingly increased rates of schizophrenia. Also some studies (but not all) find that people who eventually are diagnosed with

schizophrenia were born closer to the flu season in the winter and early spring months (season of birth effect). Abnormal fetal growth and development, complications during pregnancy, and hypoxic effects during delivery have also been linked to later development of schizophrenia in genetically susceptible individuals.

Researchers have examined psychological mechanisms that may also contribute to schizophrenic psychosis. The psychological factors outlined below are theorized to occur concomitantly with or as a result of biological factors. Research has found, for example, that schizophrenia patients may have increased psychotic behavior because they frequently respond to the most immediate environmental stimuli without regard to the overall context and do not show normal latent inhibition mechanisms. Other studies have found that patients with schizophrenia may be more prone to hallucinate because they readily acquire abnormal sensory conditioned associations and have difficulty in source monitoring. Source monitoring failure has been linked to schizophrenic thought disorder. Schizophrenic patients are also more likely to show attributional biases and reasoning deficits that may contribute to delusional thinking.

ROLE OF THE FAMILY

Although certain aspects of one's family life, such as living in generally stressful circumstances, may contribute to schizophrenia, many theorists see this as a consequence rather than a direct cause of the disorder. Family members who display high expressed emotion (EE) are rated as hostile, overinvolved, and highly critical of their schizophrenic relative. High levels of EE have been found to result in higher relapse rates than in patients returning from the hospital and living with family members who are low on these EE dimensions.

OTHER CONSIDERATIONS

People with schizophrenia are at greatly increased risk for suicide, substance dependence, committing violence against others, being the victim of violence, and being stigmatized by society. The majority of schizophrenic patients also lack awareness of the fact that they have a mental illness (anosognosia). Consequently, patients believe their delusions and hallucinations are real. Although not part of the formal diagnostic criteria, all of these factors may interact to exacerbate schizophrenic illness. Many schizophrenic patients, for example, are homeless because they have difficulty maintaining employment and are alienated from their families and lack the necessary insight needed to maintain their treatment regimens. Also, the massive closing of psychiatric hospitals and introduction of managed behavioral health care has resulted in significantly fewer mental health services available to patients in need of psychiatric hospitalization or housing. Homelessness may increase the risk for substance misuse, violence, victimization treatment noncompliance, and suicide for the individual with schizophrenia.

It is also important to evaluate symptoms from within the cultural context of the patient when determining a schizophrenia diagnosis. What may be normal behavior in one culture may not be in another. Hallucinations, which are usually seen as abnormal in Western culture, may be normal under some circumstances in other cultural contexts. It may be more acceptable in some Native American, West Indian, and African cultures than in others, for example, to believe family ancestors are speaking to them and exacting a tangible influence on their daily lives. Similarly, some Asian cultures may value more unemotional interactions, which may be misconstrued as flattened affect.

TREATMENT

Schizophrenia is a lifelong disorder. Antipsychotic medication is the most common treatment for symptom alleviation. Perhaps the most widely known neuroleptic medication is chlorpromazine (Thorazine), a phenothiazine that was introduced in the 1950s and was the first drug to effectively reduce positive symptoms in schizophrenic patients. Overall, neuroleptics have been shown to be effective but often produce severe neurological side effects, including extrapryamidal side effects and tardive dyskinesia due to massive dopamine blockade in the subcortex. Newer drugs, known as atypical antipsychotics, such as clozapine (Clozaril), risperidone (Risperdal), and olanzapine (Zyprexa), seem to be at least as effective as phenothiazines without inducing as many side effects. These medications are more selective in their dopamine blockade in the brain and also affect other neurotransmitter systems. Atypical antipsychotics also have been found to be effective in the treatment of patients who did not respond to traditional neuroleptic medications. The advent of atypical antipsychotic medications, particularly clozapine, represent a major step forward in

the pharmacological treatment of schizophrenia. They do, however, come with some risks, including a potentially fatal blood illness (if not caught in time) called agranulocytosis (a decrease in the production of white blood cells), occurring in about 1% of clozapine-treated patients. Consequently, clozapine-treated patients require monitoring of the blood every 2 weeks.

However, it is clear that the most effective treatments for schizophrenia combine psychopharmacological with a wide range of psychosocial intervention programs. These behavioral interventions include psychosocial-based learning programs, communication and social skills training, community living training, family intervention, supported employment, assertive community treatment, and cognitive behavioral therapies. Effective management of schizophrenic illness can only come from a combination of psychopharmacotherapy and aggressive application of the evidence-based psychosocial interventions listed above. These treatments may serve to increase functioning, and community involvement, decrease the need for hospitalization, and ultimately significantly improve the quality of life of affected individuals.

—Mark Serper and Nadine Chang

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SCHOOL

The term *school* usually refers to formal, institutionalized settings for imparting socially desirable knowledge, skills, and attitudes. In modern societies, children and youth spend many years in such settings, completing tasks assigned primarily by teachers, but interacting primarily with same-age peers. Because schooling is such a major experience, it seems likely both to influence and to be influenced by children's personal development. This article considers both possibilities, starting with how (and whether) children's development affects schooling.

DEVELOPMENTAL EFFECTS ON SCHOOLS

A lot of research and literature takes human development as a given independent variable and argues that school can and should adjust methods to how children grow and change. A specialty that advocates this viewpoint especially strongly is early childhood education (nursery, kindergarten, and the early primary school grades). In early childhood education, "developmentally appropriate practice" includes ample use of "hands-on," sensorimotor experiences, encouragement of elaborated oral language, and leeway for children to choose their own activities. The features are thought to reflect principles of cognitive development as formulated by Piaget and other developmental theorists.

Among older students, pedagogical responses to youthful development are also advocated, although they are not necessarily named as "developmental." The existence of middle schools, for example, and of the former junior high schools, reflects both the research and the popular belief that participating in peer groups is often stressful for adolescents, especially early in this period of life. Middle schools were invented, so to speak, to ease the transition to peers by protecting young adolescents initially from the dominance of older peers, by reducing the initial size of peer cohorts, and by introducing adult-like responsibilities to youngsters more gradually than otherwise possible.

In spite of responses such as these to the development of students, however, the influence of developmental knowledge on schooling has been limited because of both conceptual flaws and practical problems. Conceptually, the assumption that "ages and stages" describe young people is often criticized by developmentalists themselves on the grounds that stages are often imprecise in timing and not easily identified in everyday, nonexperimental conditions. It is hardly fair, therefore, to expect educators to achieve a precision about children's developmental "levels" that

developmentalists themselves have not achieved. As a practical matter, furthermore, the very diversity of students makes educational responses to diversity difficult or at times even unrealistic. The vast literature critiquing education, in fact, can be interpreted as testimony to the difficulties of making a mass, compulsory institution truly responsive to the individuality of children and youth.

That said, it is still true that human development influences schooling, but the effects are often not considered "developmental" in the sense of reflecting particular age-related changes in human nature. Research has found, for example, that students' classroom behavior can influence teachers to present a program more (or less) abstractly (or concretely); but such influence can happen at any level of schooling, from kindergarten through high school. Research has also documented (rather obviously) that students' misbehavior can cause teachers to impose stricter controls on behavior and to reduce opportunities for students to self-regulate their behavior. But this effect, too, can happen at any level of schooling, and in this sense is nondevelopmental. The safest generalization is that, overall, human development has contradictory, ambiguous effects on schooling. Whatever tasks are expected on any one occasion can support learning and "growth" in one student but leave another student more confused or even alienated from the demands of "maturity." This fact makes assessment of schooling puzzling and difficult. But given that schooling is institutional and that human development is individual, it seems inevitable.

SCHOOL EFFECTS ON HUMAN DEVELOPMENT

If schooling is taken as the independent variable and human development as the dependent variable, then consistent effects do become visible. Oddly, though, educational research generally shows that the effects have little to do with specific curriculum goals, even though curriculum is the ostensible, explicit purpose of schooling. In the 1960s and 1970s, for example, longitudinal studies of well-designed preschool programs for children from low-income families found few differences in the effects of alternative curricular approaches. Programs that were highly structured and teacher centered had about the same impact as programs that were moderately structured, or even as programs that were open-ended and child centered. Similar results have been found for curricular initiatives with older students. For example, programs designed to develop middle and high school students' ethical and moral sense ("character education") generally do not have measurable effects on character: They may have impact, but the impact is too complex and contradictory to reveal trends.

But inconsistent curricular impact does not mean that schooling itself has no broad developmental effect on students. The studies of preschool mentioned above, for example, also found that some sort of carefully planned preschool program does benefit children from low-income families; it just does not matter exactly which sort of program is planned. And analysis of character education programs suggests that students' experiences with teachers and schools do influence their ethical sensibilities; but the influence is as much in spite of teachers' efforts as because of them. The conclusion—that effects of schooling are real, but somewhat "accidental"—may not be as ironic as it appears. The breadth, duration, and complexity of most developmental change make school influences both inevitable and reasonable, but also beyond the power of particular teachers or specific curricula to influence broadly.

Effects on Cognition: Literacy

Schooling does seem to affect cognitive development because of its pervasive emphasis on literacy. Virtually all teachers, regardless of grade level or subject area, expect students to acquire and use knowledge of print, and most students do in fact acquire this ability at least to a moderate extent. Because of the nature of text, successful reading eventually fosters forms of metacognition—reflection on or self-awareness of cognition itself. Metacognition appears because reading requires more than "breaking the code." In addition, effective readers must also realize that print (as opposed to oral language) is a second-order symbolic system: It does not represent the world directly but instead represents language that in turn represents the world. The printed set of letters in *caterpillar,* for example, represents the spoken sounds in /caterpillar/, but only the latter directly represents the small worm-like creature that later becomes a butterfly. Young children often do not understand this idea, and therefore think that the printed word *caterpillar* is shorter or smaller than the printed word *train,* because real caterpillars are shorter and smaller than real trains.

Realizing that printed text stands for language rather than for the world leads to important developmental changes in thinking. It makes possible the insight, for example, that what a person says may differ from what the person means. It also creates the belief that words have fixed meanings (enshrined in dictionaries) that are independent of their oral use on any one occasion. These ideas in turn lead to the realization that words can be misused, either accidentally or on purpose; hence, false beliefs (mistaken ideas) become possible, but so does deliberate lying about the truth. In schools, in addition, using words correctly becomes an ongoing issue between teachers and students. Striving for accuracy in language helps to develop achievement motivation for some children. When overdone, though, it can also create pedantic perfectionism or even alienation from schoolwork if children fail chronically to meet teachers' standards of linguistic accuracy.

Effects on Social Relationships: Peers

Schools provide copious contact with same-age peers, and as time goes on, they tend gradually to restrict contact with adults (the teachers) to business-like, formal relationships. These circumstances make it an increasing challenge for older students to identify with the goals of schooling (preparation for career, self-fulfillment) and hence to develop a confident personal identity. They also make peers increasingly important as alternative sources of meaning. Social psychological studies of life in middle schools and high schools document the salience of peer social systems structured around large "crowds" and smaller "cliques," and organized hierarchically in the minds of the participants. With only a few exceptions, most adolescent crowds and cliques influence individuals to limit or even conceal expressions of academic interest and motivation, whether they feel interest and motivation or not. In some cases peers also increase individuals' vulnerability to high-risk behaviors (e.g., drugs or early sex). Such influences interact, of course, with teenagers' relationships with family members. With an appropriate mixture of support, freedom, and protection at home, potential negative effects of schooling can be moderated substantially. Achieving a healthy, developmentally appropriate mix is often easier said than done. But in principle, at least, parents and family members can frame the long-term purposes of schooling more meaningfully than can peers, and interpret the short-term expectations of peers in ways that help a child respond to peers more as friends than as a monolithic pressure group.

—Kelvin L. Seifert

See also After-School Programs, Charter Schools, Grade Retention, Reading, School Dropouts

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SCHOOL DROPOUTS

The importance of earning a high school diploma has increased dramatically over the past 50 years. Dropping out impacts individuals and society on a number of fronts, including employment, finances, and crime. Dropout rates can be measured in two ways. The event dropout rate compares the number of people who are not enrolled in school (and did not graduate but were enrolled during the previous year) to the total enrolled during the previous year. The status dropout rate refers to the percentage of people who are not enrolled in school and have not graduated, regardless of whether they were enrolled during the previous year.

FREQUENCY

Between October 2001 and October 2002, among the civilian noninstitutionalized population, 367,000 students in grades 10 through 12 dropped out of school, translating into an event dropout rate of approximately 1 out of every 30 students in those grades. The 2002 event dropout rate (3.3%) is only slightly below dropout rates between 1967 and 2001, which ranged from 4.0% to 6.7%. Apart from a downward trend during the 1980s, event dropout rates have remained relatively unchanged. Each year since 1990, this consistent school leaving has resulted in more than 3 million people between the ages of 16 and 24 who were not enrolled in school and had not graduated. In 2002, the number reached 3,721,000, a 10.5% status dropout rate in the young population.

DEMOGRAPHICS

Age

Dropping out tends to occur beyond the traditional high school ages. While relatively few students ages 15 to 18 dropped out in 2000 (2.9%, 3.5%, and 6.1%, respectively), 9.6% of 19-year-olds and 16.1% of 20- through 24-year-olds dropped out. In 2002, 55% of people between the ages of 16 and 24 were beyond traditional high school age, but over two-thirds of young status dropouts were between 19 and 24 years old.

Gender

Over the majority of the past three decades, males and females did not experience significantly different event dropout rates. Between October 2001 and October 2002, 3.2% of females and 3.5% of males dropped out of grades 10 through 12. However, 14% of males ages 18 to 24 were not enrolled and had not graduated from high school in 2002, compared with only 10.6% of females in that same group.

Income

Students from low-income families are less likely to stay in school until graduation than students from high-income families. In 2000, only 1.6% of students from families in the top 20% of the income distribution dropped out. That same year, the event dropout rate for students from middle-income families was 5.2% and 10% of students from families with incomes in the lowest 20% dropped out.

Location

Location has been shown to relate to dropout rates. In 2001, high dropout rates were observed most often in large or midsize cities and least often in rural areas. In addition to the size of a city, region impacts dropout rates.

Across the country, regional event dropout rates did not vary widely in 2000, ranging from 3.8% in the West to 6.2% in the South. However, significant regional differences in status dropout rates occurred in 2000, as they have since the mid-1970s. Status dropout rates in the South (12.9%) and West (11.3%) were significantly higher than status dropout rates in the Northeast (8.5%) and Midwest (9.2%). Considering the proportion of young adults living in each region, the Northeast and Midwest experienced disproportionately low dropout rates, the West experienced proportionate dropout rates, and the South experienced disproportionately high dropout rates.

Race/Ethnicity

A great disparity exists among racial/ethnic groups in terms of event and status dropout rates. White non-Hispanics have experienced consistently lower dropout rates than black non-Hispanics since 1967. Additionally, Hispanics have experienced the highest dropout rate each year since the earliest year for which figures are available, 1972. Figures for Asians and Pacific Islanders are available from 1999, showing the lowest dropout rates. In 2002, among the civilian noninstitutionalized population, Asians and Pacific Islanders experienced an event dropout rate of 2.3%, followed by white non-Hispanics (2.4%), black non-Hispanics (4.5%), and those of Hispanic origin (5.3%). That same year, the status dropout rate for Asians and Pacific Islanders was 4.2%, followed by white non-Hispanics (7.5%), black non-Hispanics (13.4%), and Hispanics (30.1%).

Over three decades of records provide evidence that group dropout rates have declined for whites and blacks, while the gap between the groups also decreased. In 1967, the status dropout rate for whites was 5.7 percentage points higher than in 2002 and the status dropout rate for blacks was 20 percentage points higher than in 2002. However, the decline in dropout rates for blacks is partly due to a striking increase in incarceration rates among black high school dropouts since 1980. Incarcerated individuals are removed from

the civilian noninstitutionalized population, which is used to determine dropout rates.

While other racial/ethnic groups experienced reduced dropout rates, the event and status dropout rates for Hispanics have remained high. While the highest recorded Hispanic event dropout rate occurred in 1978 (12.3%), similar rates occurred as recently as 1995 (11.6%) and the event dropout rate has yet to fall below 5%. Additionally, Hispanics have repeatedly experienced 40% status dropout rates (40.4% in 1972, 40.3% in 1980, and 39.6% in 1988 and 1991) and the rate has never fallen below 30%.

Hispanics who are born in the United States are less likely to graduate than their peers but are more than twice as likely to graduate as foreign-born Hispanics. Hispanics are the only racial/ethnic group to experience a difference in dropout rates dependent on timing of immigration, which may be due to language difficulties. In 1995, 62.5% of Hispanic dropouts born outside the United States had never enrolled in a U.S. school. Most of this group who had never enrolled reported speaking English "not well" or "not at all" (79.8%).

COSTS

Employment, Income, and Poverty

Since the 1950s, the value of a high school degree has changed from an advantage in the labor market to a minimum requirement for entry-level positions. Employment is a challenge for those who do not graduate. Nearly 30% of people who dropped out between October 2001 and October 2002 were unemployed in June of 2003, while only 16.9% of recent high school graduates who were not enrolled in college were unemployed. Overall, the unemployment rate for dropouts is 60%, while the unemployment rates for high school and college graduates is 40% and 20%, respectively.

A dropout who is able to find work still earns less money than a high school graduate. Just as the need for a high school degree has increased over the past few decades, the hourly wage for high school dropouts has decreased—by 31% (adjusted for inflation) between 1973 and 1997. The result is an average yearly earning for high school dropouts of $9,245 less than for high school graduates and a difference of $369,819 over 40 years. Additionally, compared to high school graduates who do not go on to college, dropouts are more likely to fall into poverty, to apply for and receive public assistance, and to stay on public assistance longer.

Societal Impact

In addition to effects on the personal level, dropping out impacts the national community. Due to dropouts' reduced income, the country loses lifetime tax revenue estimated between $200 billion and $944 billion for each year's class of dropouts. Additionally, the government spends an estimated $24 billion more due to public welfare and crime for each class.

Increased crime-related expenditure is reflected in the disproportionate amount of dropouts in the nation's jails and prisons. Compared with the percentage of dropouts in the noninstitutionalized adult population (18% in 1997), the institutionalized population is composed of high percentages of dropouts: 31% of probationers (1995), 47% of local jail inmates (1996), 27% of federal prisoners (1997), and 40% of state prisoners (1997) are dropouts.

PROGRAMS TO REDUCE DROPOUT RATES

A number of organizations have identified effective strategies and characteristics of dropout prevention programs. Such characteristics include early identification and programming, personalized attention, innovative structures, experiential learning, safe school climate, high standards, and long-term support. While many programs feature one or more of these characteristics, not all programs have proven effective. Included among the programs that have been proven to reduce dropout rates for participants are Advancement Via Individual Determination; Career Academies—Junior ROTC; Coca-Cola Valued Youth Program; CollegeBound; DeLaSalle Model; Gateway to Higher Education; Graduation, Reality, and Dual-Role Skills; I Have a Dream; Maryland's Tomorrow; Quantum Opportunities Program; SCORE for College; Tech Prep (TX); Turner Technical Arts High School; and Youth River Watch.

SUMMARY

The nation's graduation rate has improved over recent decades. Meanwhile, the importance of a high

school degree has grown exponentially. Still, race/ethnicity, income, and region are factors in dropout rates. With prevention programs targeting those most at risk, improvement may continue.

—Anne S. Beauchamp

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SCHOOL READINESS

"School readiness" has to do with how likely children are to adjust to the school environment and do well in kindergarten and early elementary school. The transition to school is an important period in young children's lives because many important attitudes, beliefs, relationships, and skills are formed during early schooling and these affect children's later academic, social, emotional, and motivational development. Indeed, trying to ensure that every child is ready for, and will thrive in, early school has been an educational and political policy priority for the past 20 years.

Although current researchers and practitioners are beginning to see school readiness as a two-way street—that is, believing that the question "Is the school ready for this child?" is just as important as the question "Is this child ready for school?"—most of the earlier focus has unfortunately been placed on examining only factors within the child that are important for predicting early school success. Even though we know that (1) parenting practices and children's early experiences in the home are critical for school readiness; (2) the type and quality of teacher, the early school setting, and the curriculum are all important for predicting children's school transition; and (3) the culture of early school settings varies considerably from school to school, the cultural diversity of today's families is great, and the goodness of fit between family culture and the school environment is critical, the focus has largely been on assessing whether the child is ready for what is presumed to be a fixed and universal early school setting.

One typical way of doing this is to look at the child's age and simply set a cutoff age for beginning school. Interestingly, although many parents decide to hold their child back a year and have him or her start school later, thinking that the gift of another year will ensure readiness and success on the part of the child, there is absolutely no support for this practice in the research that has been conducted. Holding kids back a year by itself does not seem to do much good on average and may even have some side effects such as lowering children's motivation and self-esteem and souring attitudes toward school. Because massive variation from child to child in skills and prior experiences still exists even within the span of only 1 year of age, and because birth-date deadlines are not that effective in yielding age-homogeneous groups of kindergarteners anyway, some schools use a wide variety of available standardized (or school-made) readiness assessment checklists, surveys, or tests to determine if children are "ready" for school.

These assessment instruments typically cover children's academic skills (e.g., counting to 10, recognizing letters of the alphabet) and/or developmental milestones (e.g., hopping on one foot, drawing shapes) and are administered before either kindergarten or first-grade placement decisions are made, with the idea being if they pass the test they get to advance to school. The problem is that these school readiness assessments, although fine for their original purpose—to make specific curriculum and intervention decisions on individual children—are not very good for making global program placement, advancement, or retention decisions. Children deemed "unready" by the test who go on to school anyway are often indistinguishable a year later from those classmates deemed "ready" when they took the same test.

The bottom line for school readiness assessment is that there is no easy, magical, or scientific way to definitively determine how well children are going to do as they enter school. It depends on the child's preschool experience; exposure to academic, literacy events, regular routines, and positive social interactions

inside and outside of the home; interaction with materials that allow the child to explore and derive a sense of mastery of their environment; and the classroom teacher and environment. If a readiness assessment instrument reveals that there are particular areas of deficiency for a child's learning skills, then what is important is getting the child the specialized therapeutic educational services he or she needs to remediate the problem, not just waiting another year and hoping the problem goes away.

—Adam Winsler and Martha Carlton

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SCHOOL YEARS

The term *school years* refers to the years in which children of many cultures find themselves undergoing formal education. During the approximate ages of 6 to 11, children around the world spend more time away from direct parental supervision and show increasing independence and ability to take on more mature responsibilities. They also become increasingly engaged with their peers. In most industrialized and many nonindustrialized societies, these changes occur at the same time that children are immersed in a school setting. These years are distinctive from other periods of development because children begin, often in limited ways, to participate directly in the world of adults, and receive deliberate training in the values and important knowledge of this world. However, children in this age group are widely believed not to have the full understanding and expertise held by adults. They also do not typically engage in the romantic or sexual relationships in which adolescents and adults participate.

There are many hallmarks of entry into this period of development, most of which appear across widely differing cultures. Physically, children become larger, stronger, and capable of better balance and coordination, although they have not yet undergone the development of secondary sex characteristics associated with puberty. Cognitively, children in this age group appear better able to think in two ways at the same time. For example, they become more fully capable of considering others' viewpoints, they consider alternative logical possibilities, and they begin to integrate conflicting ideas in areas as diverse as emotional understanding and reasoning about physical concepts. Children in middle childhood are more consistent in their reasoning and more deliberate in planning their activities than when they were younger. Socially, children in the school years become deeply engaged in the world of peers and begin to form a sense of personal identity that includes their role in the larger world as well as in their own families. Children have more independence from their parents, increasingly regulate their own behavior, and are held to higher standards by their parents than in the preschool years. They also begin to participate more fully in cultural institutions such as schools, religious communities, and social organizations.

In the following paragraphs, major changes that occur in the school years are outlined for the broad areas of physical development, cognitive development, emotional development and self-understanding, and social relationships. These areas are thought to overlap and influence one another in many ways. In each of the areas outlined, connections to other aspects of development at this time period are noted. The overall picture of development in the school years is one in which changes in physical and cognitive competence are mirrored in widespread changes in children's self-understanding and social relationships.

PHYSICAL DEVELOPMENT

Many societies recognize that children are starting to leave the preschool years behind when they lose

baby teeth. For most children, permanent teeth gradually replace the 20 baby teeth between the ages of 6 and 12. Although the loss of teeth and accompanying "toothless grin" is perhaps the most obvious outward marker of entry into middle childhood, this period is also a time of important skeletal growth. The average child in the United States weighs 45 pounds and is 42 inches tall at age 6. Over the next few years, children grow two to three inches in height and gain about 5 pounds each year. This growth is not as rapid as in early childhood or in adolescence but is still noteworthy. The lower portion of the body grows the most quickly in middle childhood, so that children in the school years often look "leggy" or "lanky" compared with younger children. Children's bones increase in both length and broadness during this time period. Because the ligaments are not yet firmly attached to the bones, children in this age group are quite flexible compared with both younger children and adults. Skeletal growth is associated with new accomplishments in motor development. In particular, children in middle childhood show marked increases in strength, balance, and coordination. They run faster, jump higher and farther, and become accomplished in skills such as kicking balls, swimming, riding bicycles, and climbing trees. At the outset of the school years, girls tend to be slightly smaller and thinner than boys. Girls, however, enter the adolescent growth spurt about 2 years earlier than boys, so that by age 9 girls typically catch up to boys in height and weight, and by age 10 to 11, they often are taller and look more mature than their male age-mates.

In addition to growth in height and weight, children show important brain growth in middle childhood. In particular, the frontal lobes of the cerebral cortex, thought to be responsible for consciousness, planning, and impulse control, increase in weight and undergo myelination. Synaptic pruning is a normal process that leads to the death of unused synaptic connections and increased stability of heavily used connections throughout the brain. This process occurs at different rates in different areas of the brain throughout childhood. Synaptic pruning in the frontal cortex is especially prominent during middle childhood. Other areas undergoing major brain development in middle childhood include the parietal lobes (involved in spatial abilities) and the corpus callosum (allowing enhanced communication between the two hemispheres of the cerebral cortex). These changes are associated with increased lateralization of brain function.

Patterns of electrical activity in the brain, as measured by electroencephalography (EEG), show an increase in alpha waves (characteristic of periods of alert attention in adulthood) and a decrease in theta waves (characteristic of adult sleep) during middle childhood. Before age 5, there is more theta activity than alpha activity. The two types of activity are approximately equal between ages 5 and 7, and then alpha activity is more common than theta activity from age 7 into adulthood. Moreover, different areas of the brain show increased synchronization of electrical activity during middle childhood, suggesting greater coordination of the various brain parts. This increase in EEG coherence is especially marked between the frontal lobes and other areas of the brain.

Other brain changes in this time period are less fully researched, but there is some evidence that synaptic responding to neurotransmitters becomes more selective in middle childhood. It has been suggested that this more specialized chemical responsiveness of synapses may lead to greater efficiency in school-aged thinking. The adrenal glands release more androgens (male sex hormones) in both sexes beginning at around age 7, which may also affect brain organization in middle childhood. Later increases in androgens for males are known to affect brain organization in adolescence, but the effects of androgens on both sexes in middle childhood are less well understood.

COGNITIVE DEVELOPMENT

Most psychologists believe that the many cognitive changes that occur in middle childhood are intimately connected to and enabled by the brain changes described above. Theorists from different perspectives tend to agree that a hallmark of school-aged thinking is the ability to consider several different, even conflicting, aspects of a situation at the same time. Jean Piaget describes this change as an increase in reversibility, that is, an increase in the ability to carry out mental operations flexibly. This change is the main characteristic of entry into the period of concrete operations, a stage in which children show a marked increase in logical reasoning. Entry into this stage is thought to occur around ages 6 to 8 across the world. (Piaget believes, however, that children in the concrete operational stage are only logical when reasoning about tangible objects or events. According to his theory, children do not have the ability to engage in

reversible reasoning about abstract or hypothetical problems until they enter the period of formal operations at about age 11 or 12.)

Piaget's best-known method for assessing children's entry into the period of concrete operations is the conservation task. Conservation actually refers to a family of tasks that present children with two equal quantities or qualities, make a change to the outward appearance of one, and require children to recognize that the underlying quantity or quality has not changed despite the change in superficial appearance. For example, the conservation of liquid task is often passed by 7- or 8-year-olds. In this task, the experimenter puts two identical beakers partially filled with liquid (e.g., colored water) on a table in front of the child. The experimenter asks the child if one container has more liquid or if both have the same amount. Both preschoolers and children in middle childhood recognize that the two containers have the same amount of liquid. Next, in full view of the child, the experimenter pours the contents of one beaker into a taller, thinner glass. The other beaker remains unchanged. Now the experimenter repeats the question of whether one container has more liquid or if both have the same amount. Preschoolers answer by referring to only one dimension of the appearance of the liquid in the new container. Typically, they point to the greater height of the liquid and state that there is now more liquid in the new container. School-aged children, however, consider both aspects of the visual appearance of the containers, and state that although the liquid is higher in the new container, it is also narrower. They assert correctly that both containers still have the same amount of liquid.

The increase in reversibility that characterizes concrete operations can be seen in children's "decentrated" responses, in which they can focus on two competing dimensions of the containers at the same time. They recognize that the greater height of the new container is compensated for by its narrower width. The increase in reversibility is also seen in school-aged children's recognition that the experimenter could easily pour the liquid in the new container back into the old container, and it would still be the same amount of liquid as before. Piaget argues that this increase in the ability to consider two conflicting pieces of information together results from maturation of thought structures.

Many recent theorists disagree with Piaget's stage analysis of this shift, arguing that it takes place more gradually than his work suggested. They also report evidence suggesting that the shift reflects changes in a variety of underlying cognitive skills rather than a fundamental reorganization of thought structures. For example, children can sometimes solve conservation tasks correctly as young as 4 years of age when the tasks draw on areas in which they have extensive background knowledge or when the language of the tasks is modified to clarify ambiguities. These findings indicate that even very young children are sometimes capable of more mature thinking. Nonetheless, there is widespread agreement that children do not typically pass Piaget's conservation task until they enter the school years. Despite the fact that younger children may have pockets of capability, and may show advanced logic in certain circumstances, they do not show consistent use of reversible logic until they are in middle childhood.

Another important arena in which Piaget notes an increase in reversible thinking is in taking other people's perspectives. In his three-mountain task, Piaget showed children a three-dimensional model of papier-mâché mountains on a table. He seated each child at one side of the table and asked the child to arrange small cardboard images of the mountains to indicate their appearance to a doll seated on a different side of the table. Piaget found that younger children often arranged the cardboard to show their own view of the mountains rather than the doll's view. Piaget called this inability to take a different visual perspective egocentrism. School-aged children, however, could accurately identify the doll's perspective when it contrasted with their own. Piaget noted that similar difficulties with egocentrism appear in preschoolers' language, in that they often fail to adjust their communication to make it comprehensible to others without the same background information. Concrete operational children, however, typically communicate in ways that account for others' needs and access to relevant information.

More recent research has pursued a similar question in the study of *theory of mind*. This term refers to the fact that we never directly see the contents of other people's minds and, in the absence of direct evidence, must formulate theories about what others think, know, believe, and feel. Most studies agree that children begin to understand other people's minds as distinct from their own sometime around the age of 3, and solidify this understanding at 4 and 5 years of age. Thus, recent research sees a shift in perspective-taking

skills as occurring somewhat earlier than Piaget believed. Whether these skills are just beginning, as Piaget argued, or whether they are firmly in place, researchers agree that a major way in which school-aged children differ from younger children is that they are able to consider other people's points of view. This cognitive change reflects the larger tendency to consider conflicting aspects of a situation and has numerous implications for children's functioning in the social world.

Information-processing theorists focus on specific cognitive skills rather than underlying changes in thought structures. They agree that children in the school years show increased logic, consistency, and ability to consider and weigh several pieces of information at once. For example, school-aged children become much more skilled at classifying information, such as categories and subcategories of animals or plants. Children also become more skilled at finding their way through their neighborhoods because they can consider landmarks from several directions and angles at the same time. Information-processing theorists argue that children move from isolated competencies to widespread competencies because of improvements in the ease, speed, and flexibility with which they can deploy specific cognitive skills.

In particular, memory processes improve dramatically in the early school years. The speed with which children can encode new information into memory and retrieve stored information from memory improves, leading to the ability to hold greater numbers of items in working memory—that is, to actively think about more pieces of information at once. Children have a much greater knowledge base with which new information can be interpreted and integrated, leading to improvements in the ability to encode new information. Children also use memory strategies, such as rehearsal and organization of information to be remembered, much more consistently and efficiently in middle childhood. For example, in a classic study conducted by Terrence Keeney, Samuel Cannizzo, and John Flavell, 5- and 10-year-old children were asked to remember sets of seven pictures for periods of 15 seconds. Older children moved their lips while waiting because they repeated, or rehearsed, the lists of items. Younger children rarely showed any evidence of rehearsing the items. Those children who rehearsed remembered more items than those who did not, regardless of the age of the child, and younger children who were taught to use rehearsal did so effectively and improved their performance. This study indicates that younger children are capable of using strategies to improve their memory, but that they rarely do so. In contrast, school-aged children approach memory tasks differently by choosing to engage in strategies that increase their success. Some psychologists have argued that a major part of development in the school years consists of children's increasing ability to select and use the most efficient strategies to enhance their performance.

Similar findings exist in the area of attention. School-aged children can sustain and direct their attention more skillfully than younger children, so that they deploy attention to various aspects of problems in a systematic fashion rather than having their attention "captured" by random aspects of the task. Children in middle childhood are better at ignoring distractions and choosing what they will pay attention to.

In part due to improvements in memory and attention, children become better able to plan their behaviors or approaches to problems during the school years. They are more likely than younger children to plan their approach to a complex task ahead of time. They can pursue a goal for a longer period of time and meet more subgoals along the way. They can shift means of obtaining the goal along the way, suggesting an ability to consider the goal and the means as separate aspects of a situation.

Overall, a major cognitive development in the school years is metacognition. This is the ability to think about thinking, to reflect on one's approach to a problem at the same time that one is also trying to solve the problem. In many different arenas, children in the school years show increased awareness of their own thought processes and greater skill at finding ways to focus and improve their thinking.

In the area of language, children undergo similar development in the school years. Their vocabulary improves at a tremendous rate; recent estimates indicate that the typical 6-year-old has a vocabulary of 10,000 words, while the typical 10-year-old has a vocabulary of 40,000 words. Children's increased ability to appreciate alternative meanings of words leads to their fondness for jokes involving word play, such as knock-knock jokes. Children also show increasing metalinguistic awareness, that is, the ability not only to use language but also to reflect on it.

In most industrialized and many nonindustrialized societies, children spend many hours of middle childhood in school. Children can benefit more from direct

instruction at this age than at earlier ages because of their improved memory, attention, and language skills. In recent years, developmentalists have grown increasingly interested in the question of how schooling itself affects children. Most studies indicate that children acquire large amounts of specific knowledge in school; this knowledge is typically that held important in the larger culture. In most countries, the early school curriculum is focused on mathematics and language arts, and it is in these areas that the most dramatic increases in knowledge and skills occur.

Less clear, however, is the answer to the question of how school affects children's reasoning skills. Some studies have found that children in school, when compared with children from similar backgrounds who do not attend school, show no differences in the ages at which they pass Piagetian tasks. Other studies do show some improvements in reasoning on Piagetian tasks. The current evidence suggests that children in school become more skilled in using memory strategies in particular and metacognitive skills in general, so that overall they approach cognitive tasks more logically and with more planning than children of the same age with little experience in school. Sometimes these skills lead to improved performance on Piagetian tasks. However, the school-related changes seem to affect children's understanding of cognitive testing itself, rather than raw cognitive capacities. Children in school are more used to being asked questions by an adult who already knows the answer, and have better strategies for figuring out how to answer these questions. They are able to reason about problems apart from the real-life context in which the problem might appear. For example, Terezinha Nunes and colleagues studied children with little school experience who were street vendors in Brazil. The study found that the children were very skilled in solving math problems in the context of real transactions in their places of business. However, when given the identical problems in a classroom setting and without a business context, the same children's mathematical reasoning was much less advanced. Schooling appears to enhance children's abilities to marshal their thinking skills to solve abstract problems.

Overall, there are larger effects of school attendance. In most countries, children who attend school later have better access to jobs and higher income than children who do not. In the United States, adult income level is closely associated with years of education. Thus, children who attend school grow up to have more financial resources. They also appear to have better skills in negotiating with health care providers and are more likely to engage in direct teaching with their own children. Thus, some researchers suggest that schooling for children eventually leads them to become parents who are more able or likely to raise their children in ways expected in schooled society.

Children's entry into school is usually the first time that they are expected to sit still for long periods of time and to engage in sustained cognitive activities. Clearly this arrangement suits some children better than others. It is estimated, for example, that 25% of children have great difficulty learning to read when taught by traditional methods. Children are first likely to be diagnosed with disorders related to learning, such as specific learning disabilities and attention deficit disorder, during the school years. Currently, a great deal of educational research is focused on designing alternative classroom styles that allow children to participate more actively in the learning process and provide better learning opportunities for children with different learning skills. There is also a large amount of research on ways to create classrooms that are sensitive to cultural differences in children's learning styles. Many studies have found national differences in school success; for example, Japanese and Chinese children have been found to outperform children from the United States in mathematics. Current research on schooling asks why these differences appear and how education in countries with less academic achievement in some areas can incorporate the best aspects of education in countries where children achieve more.

EMOTIONAL DEVELOPMENT AND SELF-UNDERSTANDING

Many of the social and emotional changes in children's lives during the school years are closely related to the cognitive changes described above. In the area of emotions, children become better able to regulate their emotions (consistent with better regulation of thinking skills) and show less overall emotional negativity than in earlier years. Consistent with their greater logic, children's fears are more likely to be based on realistic (if exaggerated) concerns than on imaginary creatures such as monsters. For example, children in middle childhood report fears for the health of their family members and fears of being victims of violent crimes. When they are harmed,

school-aged children are less likely to show anger unless they believe that the person who harmed them intended to do so; this change is related to children's increasing capacity to consider several pieces of information and specifically to recognize other perspectives. School-aged children are also better able to understand and reconcile conflicting emotions in themselves and others, such as excitement about an impending visit to grandparents that occurs in conjunction with sadness about being separated from one's parents.

Given children's increasing abilities to consider several different pieces of information and to reflect on their own thought processes, it is not surprising that children develop a more differentiated and abstract conception of self during the school years. Self-understanding in this age group is likely to involve some analysis of one's traits and some acceptance of these traits as relatively stable aspects of the self. For example, whereas preschoolers may describe themselves in terms of possessions and activities, school-aged children may describe themselves as "smart," "shy," or "good at sports." As in the area of cognitive development, some psychologists believe that younger children are capable of this more refined self-understanding, but that it is not shown consistently and readily until the school years.

Children are much more likely to engage in social comparison in the school years than they did earlier. Many researchers believe that this change is brought about at least in part by the school setting itself, in which children are explicitly and publicly compared to their classmates on a regular basis. It is also likely that children's increasing ability to consider conflicting pieces of information enables them to more accurately compare their own skills to those of others. Whereas most 6-year-olds tend to rank themselves near the top of their class, most 10- and 11-year-olds rank their academic skills relative to the rest of the class very similarly to their teachers' rankings. Children in middle childhood are also increasingly concerned with their peers' opinions of themselves and begin to define themselves in ways that reflect their roles in school and with their peers.

Self-esteem refers to the way in which individuals evaluate and feel about themselves. In middle childhood, self-esteem is based on a wide array of information. Some factors that affect preschoolers' self-esteem, such as beliefs about parental approval, continue to be important in the school years. New information also comes into play, however. Social comparison processes in areas of performance that children value, such as academic and athletic skill, affect self-esteem in middle childhood. Children's beliefs about their peers' attitudes toward them are also important. Physical attractiveness is also a component of self-esteem in middle childhood, as are children's beliefs about others' opinions of their own background, such as whether they think they live in a neighborhood that other children would dislike. Because children are making more realistic appraisals of themselves in relation to others, self-esteem often shows some decline in the early elementary school years. This decline is thought to be a normal part of development and not especially harmful unless it is extreme.

In cultures around the world, adults believe that success in school is a function not only of cognitive intelligence (defined differently in different countries), but also of less tangible factors such as motivation, effort, and confidence. As children enter the world of school, these factors begin to impact their academic performance and their beliefs about themselves that arise from that performance. Several psychologists (e.g., Carol Dweck, Eric Anderman) suggest that children in North America differ in whether they emphasize learning/mastery goals, or improving their skills, versus performance goals, or obtaining high marks and outward judgments of success. Different cultures, schools, classrooms, and tasks are also thought to give greater emphasis to learning or to performance goals. When children are oriented toward performance goals, they are more likely to respond negatively to failure. They interpret failure as a sign that their ability is low, experience negative emotions about themselves and the task, and often perform at less sophisticated levels or withdraw from the task. In contrast, when children are oriented toward mastering skills and improving their ability, they tend to be less disturbed by academic failure. Rather, they view failure as a temporary reflection of inadequate knowledge or strategies. They improve effort and ultimately their performance. Dweck believes that children who favor performance goals have an underlying view of their intelligence as a stable, unchangeable component of themselves, but that children who favor learning goals tend to think of intelligence as malleable and improvable with effort.

These developments in the area of achievement motivation are well documented among children in the United States by age 10 or 11, and there is

evidence that similar patterns occur in younger children as well. The complex interplay of cognitive development with emotional and social development can be seen in this example. Children's ability to compare themselves to others, to think about their own thought processes and others' judgments of themselves, and to think of their own qualities as stable can have negative consequences for some children during the school years. Children are increasingly able to judge themselves and their abilities harshly and then to behave in ways that will prevent future successes.

SOCIAL DEVELOPMENT

During the school years, parents are less often involved in direct supervision of their children. Consistent with children's greater cognitive and physical skills, parents allow children more freedom to spend time out of their sight. Some of this time away from parents is in the care of other adults, such as in school (where, however, only one or two adults are typically responsible for large numbers of children). Children are also increasingly involved in peer clubs (e.g., scouting), athletic teams, and religious organizations that involve both adults and peers from outside the family. Other time is spent with peers away from any adults, often in unsupervised play. Children in many societies bear greater responsibilities for their families, too, whether in doing chores in the home, caring for younger siblings, or contributing economically to their households. In many cases this work takes place without constant monitoring from caregivers.

In the school years, parents are often less overtly affectionate with their children. Parents hold higher standards for their children than in the preschool years, and more frequently criticize children for not meeting those standards. Discipline is less likely to be physical at this age, and more likely to involve loss of privileges. School-aged children in many societies are also more likely than when they were younger to point out inconsistencies in their parents' decisions and to argue with their parents.

Perhaps because of children's greater cognitive understanding as well as the reduced opportunity for direct supervision, parents rely more on coregulation strategies than direct supervision for discipline. That is, they count on children to behave in ways the parents would approve even when the parents are not present, and they often use disciplinary tactics involving guilt and/or reasoning, designed to have continued effects on behavior long after the moment of misbehavior is past. Despite their generally greater distance, however, there is ample evidence that parental involvement in children's lives during the school years is beneficial for children. For example, in the United States, children are more likely to engage in antisocial behavior and to be rejected by their peers when their parents do not know where they are or with whom they are playing.

As parents become less directly involved with their children, children in many cultures are immersed in the world of peers. Whereas preschoolers typically prefer to play in dyads, school-aged children often play in groups. Children still become involved in conflicts with their peers at this age, and still most often resolve conflicts by means of coercion. In general, there is a decline in physical aggression toward peers and an increase in prosocial behavior during the school years. Nonaggressive strategies for conflict resolution become more prevalent.

School-aged children continue to engage in fantasy play, as in the preschool years, but this type of play declines during middle childhood. One activity that increases during the school years across the world is playing games with rules. Although younger children play together, the rules are few and change often. Among school-aged children, however, beliefs about rules are shared by large groups of children and the rules are sustained for long periods of time in the course of game play. It is thought that children's greater perspective-taking skills enable them to set out rules clearly and uphold them for all, and that their more consistent and flexible logic allows them to use the rules for protracted play. Games with rules, not directly supervised by adults, may be occasions for practicing mature relationships and responsibilities.

At this age, children in many cultures segregate themselves by gender, especially when they are not under adult supervision. Although some children in most classrooms report having a handful of cross-gender friendships, most children's best friends and most frequent playmates are of the same gender. It is estimated that children in the school years initiate play with a member of their own gender five times more often than they do with a member of the opposite gender. Gender grouping is common on school playgrounds and in classrooms when children are allowed to choose their own groups, although it is somewhat less apparent when children play with neighbors near

their homes. Children who play with members of the opposite gender on a regular basis tend to be less popular with their peers. Eleanor Maccoby, after a review of many studies, suggested that school-aged girls, who tend to have a more cooperative style of interacting with their peers than do boys, find the rough-and-tumble, coercive interactions of boys extremely unpleasant. Boys tend to ignore girls' requests and preferences, and girls may actively seek the company of other girls so that they can experience smoother social interactions. Girls also tend to stay closer to adults than do boys, perhaps as a way of gaining protection from boys' aggressive play. Overall, peer segregation by gender appears to be self-initiated and self-perpetuated.

During the school years, children in industrialized societies differ in the extent to which their peers accept them. Developmental psychologists have identified subgroups of children with different status in their classrooms. "Popular" children are liked by most of their classmates. These children tend to be prosocial, emotionally well regulated, and socially skilled. Although they are rarely aggressive for hostile reasons, they do use aggression occasionally as a means of self-assertion. "Neglected" children make very little impact in their classrooms; rather than being liked or disliked, they are mostly overlooked. These children are not especially sociable or aggressive, but they appear to be of average social competence. "Rejected" children, in contrast, are actively disliked by their classmates. These children fall into several groups. About half of rejected children are aggressive; they tend to be hostile and disruptive in interactions with their peers. A smaller proportion of rejected children are socially withdrawn and timid. These children are not merely shy (as some neglected children may be); rather, they are also immature and show poor emotional regulation. Finally, "controversial" children have a high but mixed profile in their classrooms. They are actively liked by some children and actively disliked by others. They tend to be highly visible and to show both cooperative and hostile behaviors. They are often perceived both as group leaders and as snobs. (Peer acceptance is based on varying criteria across cultures; for example, in China, shyness is associated with peer acceptance during the school years, whereas in North America, shyness is associated with neglected social status.)

Differences in peer status are important in part because of differences in children's feelings about their social experiences. Many rejected children, especially rejected-withdrawn children, report being lonely on a regular basis. Differences in peer status are also important because they are associated with long-term adjustment. Rejected children are at greater risk for a range of later difficulties, including poor academic performance, school dropout, externalizing symptoms such as aggression and substance abuse, and internalizing symptoms such as depression. Peer relations are an important arena for children's development, and disruptions in these relations are considered a risk factor in their own right. It is likely, however, that cause and effect relations are complex in this area, and that children who are rejected by their peers may have other factors in addition to poor peer relations per se that contribute to later adjustment problems.

Bullying and victimization are common problems in the school years that tend to decline in adolescence. Some studies report that most children regularly both bully and are victimized. However, about 20% of children engage in extensive bullying, and about 15% of children are frequent victims. Although girls can bully and be victimized, it is more common for males to be bullies as well as to be victimized. Many victims tend to be passive and visibly upset when bullied, and they have few if any defenders in their peer groups. Other victims also engage in aggressive behaviors, and their occasional violent retaliations may make them targets of more bullying in the future. Many studies now suggest that school-implemented programs are effective in reducing bullying and victimization. These programs are actively encouraged in many schools because of the negative long-term consequences of bullying for the perpetrators and especially the victims.

Friendship is a supportive and mutual one-to-one relationship with another child. It is conceptually distinct from more general peer acceptance. Friendships allow children to develop social skills, experience fun and companionship, and establish models of intimate relationships. Regardless of peer status, children who have at least one reciprocated close friendship have a better chance of long-term adjustment than children without close friends. Even rejected children and victimized children with a best friend show fewer adjustment problems than those with no friends. On the other hand, aggressive and rejected children often have friendships of poorer quality than other children, and it is believed that friendships are more beneficial when they provide greater support and acceptance.

Although younger children have friends, children in the school years are increasingly aware of the qualities

of positive friendships. They cite trust, kindness, and emotional support as key components of friendship. During the school years, children gradually engage in more intimate conversation and overt self-disclosure with their friends (as opposed to self-disclosure in the context of make-believe play in the preschool years). They become more selective in their friendships. Whereas preschoolers report having many friends, most children have just a few good friends by age nine. Most children's friends are similar to themselves in social background, personality, peer acceptance, and academic success. Cross-race friendships are common in integrated schools and neighborhoods, but less common in less integrated environments. Friends are typically skilled at resolving conflicts with one another. Children's improved perspective-taking skills are thought to both contribute to and benefit from the deeper friendships that occur as children go through the school years.

One domain closely related to children's experiences with both peers and parents is moral development. Parents' use of coregulation in discipline reflects the belief that children in the school years are beginning to internalize moral values, such that they themselves desire to behave in moral ways even when others are not present to administer consequences. Over the course of the school years, children do in fact show increasing understanding of moral issues and internalization of moral values. They are increasingly likely to consider others' perspectives and intentions when making moral judgments. For example, Piaget believed that children beginning school are governed by a moral framework in which rules are immutable and punishments for rule breaking are amply justified. By age 11 or 12, however, Piaget thought that children have come to value fairness and egalitarianism, and to see rules as flexible products of social agreement. Kohlberg saw morality in the school years as moving from a concern for one's own best interests to a concern for meeting mutual interpersonal needs and expectations. The development of prosocial moral reasoning follows a similar trajectory. When asked to reason about hypothetical dilemmas pitting voluntary helping of another person against personal satisfaction (e.g., helping a boy who has hurt his leg vs. continuing on one's way to a birthday party), school-aged children from widely differing cultures exhibit concern for social approval. Toward the end of this age, children's reasoning reflects greater empathy and concern for the other person. Children in the school years are also better able to distinguish between moral rules (involving fair and just treatment of the self and others) and rules that reflect social conventions (e.g., styles of clothing, table manners). These advances in moral understanding often express themselves in the realm of peer interactions, but it is also the case that extensive peer interactions in the school years contribute to these advances. Overall, in children's moral reasoning, the interplay between their increasingly logical and flexible cognitive skills and their expanding social worlds is clearly illustrated.

SUMMARY

Physically, children in the school years increase in size, strength, and motor coordination. Their brains continue to develop, especially in the frontal cortex responsible for planning. Their cognitive skills reflect underlying brain changes; children's thinking in the school years is more efficient, logical, and consistent than when they were younger. Children are also increasingly able to consider different and conflicting pieces of information and to plan and direct their cognitive activities. Children's emotional development mirrors their increasing ability to consider conflicting information and take others' perspectives. Children come to have more differentiated and realistic views of the self, as a result of both their new cognitive skills and the new social contexts in which they find themselves. These social contexts include more time with peers and less time with parents, although parents remain important in children's lives. The world of peers allows school-aged children to use their perspective-taking skills and logic, and peer interactions in turn contribute to children's abilities to understand other perspectives and to regulate their own behavior. In this phase of development, as in others, the many interconnections between physical, cognitive, emotional, and social development are apparent. In the school years, this interplay prepares children for the more mature responsibilities of adolescence and adulthood.

—Kathleen M. Cain

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SCIENTIFIC METHOD

Science plays an important part in our everyday life. If you use automobiles and computers, or if you take prescription medicine, you are benefiting from science. Science has improved our understanding of the world and provided the basis for much of modern technology. Science has also taught us important things about human development, for example, what the normative course of child development is and what child-rearing practices are most likely to be successful.

THE GOALS OF SCIENCE

Science aims to establish general laws or theories concerning natural events and relations among them. The laws and theories in turn allow us to explain and understand phenomena. For example, a general law states that reward (i.e., reinforcement) that reliably follows a behavior will increase the future likelihood of that behavior. Based on that law, we can explain, for example, the occurrence of socially desirable behavior in terms of past reinforcement, and we have gained some understanding of why some children exhibit more socially desirable behavior than others. Further, the law allows us to *predict* how someone may behave in the future based on what behaviors are currently being reinforced. Finally, the law allows for *control* of behavior by the systematic presentation or removal of rewards following important behaviors.

SCIENCE AND OTHER WAYS OF KNOWING

The scientific approach is a means to gain systematic knowledge. However, there are other ways to gain knowledge. The first one is authority. We say we know something because somebody told us it was true. Everybody gains knowledge from authority, because we cannot test or experience everything for ourselves. If you have ever been influenced by something you read in a newspaper, what you heard the president say, or what you were told by a trusted teacher, you have gained knowledge from authority. Knowledge of this type is often correct and useful, but may also be wrong and even dangerous. History contains many examples of people being misled by authority (e.g., in Nazi Germany).

A second way of knowing is through logic. Logic involves drawing conclusions based on assumptions. For example, somebody may reason the following way:

> *Assumption 1:* All children who have a diagnosis of mental retardation fail in regular classrooms.
>
> *Assumption 2:* Billy has mental retardation.
>
> *Conclusion:* Therefore, Billy will fail in a regular classroom.

Logic is useful in reasoning about events in the world, but it only leads to correct conclusions if the assumptions are correct. The correctness of the assumptions needs to be ascertained through means other than logic. In this case, the first assumption (all children with mental retardation fail in regular classrooms) is clearly not true; thus, the reasoning process may lead us to an incorrect conclusion.

A third way of knowing is through common sense, which may be characterized as beliefs shared by a group of people. Common sense is often useful, but shared beliefs are not necessarily correct. For example, it is common sense to immediately talk to a child who has just hit a peer, in order to explain why hitting others is wrong. However, sufficient research has shown that too much attention following undesirable behavior, which may take the form of a dialogue about acceptable behavior, may in fact increase the undesirable

behavior. As an aside, it is usually better to proactively teach appropriate ways to interact than telling children what not to do after it has been done. Common sense can thus lead to ineffective practices.

A fourth way of knowing is through scientific methods, which are characterized by six essential features. First, science is empirical, which means that it is based on observation rather than opinion or logic. Second, science is objective, which means that more than one person has to be able to observe and describe the phenomena. The objective nature of science is particularly important, because it allows for replication of studies, which is necessary for results to be widely accepted. Third, science is parsimonious. If two or more explanations are equally correct, the simplest one is chosen. Fourth, science is self-correcting. Because of the emphasis on objective description of procedures and the requirement for replication, results that are anomalous, forged, or otherwise incorrect are likely to be exposed. Fifth, science is progressive, in that a cumulative body of knowledge is built. This requires that scientists be aware of relevant work in their field and design their research to extend prior knowledge. Sixth, scientific knowledge is always tentative. The philosopher Karl Popper pointed out that theories could be experimentally supported, but never proven to be absolutely true, because the possibility of falsification always remains. Thus, scientists try to design experiments whose results may falsify theories or laws. Any scientific theories or laws may be changed or replaced based on new findings. Those decisions are made by scientific communities, which consist of the scientist, the scientists's most immediate colleagues, audiences at conferences, and review boards and readers of scientific journals. Results that are discrepant with previously established findings may result in debates and additional research until the matter is resolved, either by exposing methodological flaws or by proposing a new theory or law that explains the phenomena in a more satisfactory manner.

METHODS OF SCIENCE

Scientific methods relevant to research on human development can be partitioned into three broad categories. First, the anecdotal method involves observing events under naturalistic conditions, and describing what occurred and why it might have occurred. For example, the developmental psychologist Jean Piaget constructed his theory of cognitive development by anecdotal observations of his own children. Anecdotes are lacking in most of the essential characteristics of science, and thus are often considered as starting points of a scientific method. Careful descriptions may generate ideas that can be tested using more stringent methods, as was the case with Piaget's contributions.

Second, descriptive and correlational studies also use observation and description, but the phenomena under study are precisely defined to allow for objective observation and precise description. Researchers have employed precise measures of children's performance on tasks that measure cognitive abilities, and analyzed how the performances change with age. Such studies enable us to describe the normative course of cognitive development, and to describe the correlation between age and cognitive abilities. However, it does not follow that age causes changes in cognitive abilities, because other variables (e.g., biological and environmental factors) that are correlated with age may be more relevant causal factors.

The third category of methods, experiments, is the preferred way to reveal causal relations. Its purpose is to gain control over the subject matter by manipulating potentially influential variables. For instance, researchers have investigated the extent to which attention by parents influences the rate of infant vocalizing and smiling. By showing that infants' vocalizing and smiling increase when and only when parents consistently hold and talk to infants after they smile and vocalize, scientists have convincingly shown the effects of social reinforcement. By conducting sessions under controlled conditions, scientists can minimize the effects of other potentially influential variables (e.g., they can ensure that the infants are similarly well fed and rested prior to each observation), which increases our confidence that the results were indeed due to the variable of interest (i.e., the delivery of parent attention following infant behavior) and not some other factor.

EXPERIMENTAL DESIGNS

In science, relations between phenomena are demonstrated through experimental designs, which come in several varieties. Within-subjects designs use a single individual or group and the influence of a variable is shown by demonstrating that the effects occur when the variable is present, but not when the variable is removed. The believability of the effect is increased with multiple replications both within and

across individuals or groups. Between-subjects designs employ two or more groups that are treated differently. For example, one group may receive a certain treatment while the other does not, or groups may receive different levels of treatment. Alternatively, researchers may study naturally existing groups, such as groups of people with different social backgrounds or different habits. For example, a group of children that watches a lot of television may be compared with a group of children that watches little television, with the goal of identifying differences in the respective group's ability to remain academically on task. Statistical tests are typically used to determine whether the differences between groups exceed statistical chance or not. If other potentially influential factors are held constant between groups, statistically significant differences between groups are assumed to be a function of the treatment.

Developmental psychologists, who are interested in how behavior changes over time, employ longitudinal designs, in which a group of people are assessed at different time intervals; cross-sectional designs, in which different age groups are assessed at the same time; or cross-sequential designs, in which two age groups (i.e., cohorts) are compared at different points in time. Through these developmental designs, researchers may gain some understanding of, for example, how people's performance on tests of intelligence or other abilities changes with increased age.

CONCLUSION

Despite past accomplishments of developmental scientists, much remains to be learned about human development. Furthermore, the implementation of already established scientific knowledge (e.g., about best practices in child rearing and education) is still somewhat limited. Those interested in scientific research in human development can thus look forward to many opportunities to enhance understanding and improve people's lives.

—Einar T. Ingvarsson and Gregory P. Hanley

See also Experimental Method, Hypothesis

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SEARS, ROBERT (1870–1937)

Robert R. "Bob" Sears was professor and chair of the Psychology Department at Stanford University, as well as dean of Stanford's School of Humanities and Social Sciences. He was born in Palo Alto, California.

Robert Sears's father was a professor in the Stanford School of Education, and Sears met his wife, Pauline Snedden Sears, as an undergraduate at Stanford. Although his interests were initially in literature and drama, he was drawn into the study of psychology while an undergraduate at Stanford. During his graduate work at Yale he was influenced by Clark Hull and he received his PhD in 1932 with a dissertation in physiological psychology.

Sears's first academic appointment was at the University of Illinois, where he taught abnormal and personality psychology. Searching for a method to teach personality to undergraduates, he met with success combining psychodynamic theory with learning theory, informed with examples from literature. Subsequently he conducted empirical studies in which psychodynamic concepts were operationalized and empirically tested, becoming a leading scholar in this area. While at the Institute for Social Relations at Yale, he coauthored *Frustration and Aggression* (1939). He later completed the influential monograph, *A Survey of Objective Studies of Psychoanalytic Concepts* (1943).

Robert Sears entered the field of child psychology in 1942 when he became a professor of child psychology and director of the Iowa Child Welfare Research Station at the University of Iowa. There, with his wife Pauline, he focused on issues of personality and socialization in children. He was interested in parental influences on childhood personality, and was a pioneer in the investigation of child-rearing

practices. Balancing good experimental control with ecological validity, he developed rigorous and creative methods for studying children and their parents. These included doll-play procedures to investigate children's fantasies and time sampling of children's behavior in preschool, as well as studies of parent-child interaction in the laboratory using standardized socialization procedures. This groundbreaking work produced numerous publications in professional journals, as well at the coauthored books, *Patterns of Child Rearing* (1957) and *Identification and Child Rearing* (1965). Sears's work at Iowa, and later at Harvard and Stanford, framed the agenda for the study of children's socialization.

During the latter part of his career, Robert Sears returned to the psychobiographical study of Mark Twain, in whom he had a lifelong interest. Sears had taken on the direction of the Terman Study of the Gifted after Lewis Terman's death in 1956. His work with this archive created a rich resource for scholars studying life-span development. His coauthored book, *The Gifted Group in Later Maturity* (1995), extended the study of intellectual giftedness into the aging years.

—Carole K. Holahan

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SEATTLE LONGITUDINAL STUDY

With its first data collection occurring in 1956, the Seattle Longitudinal Study (SLS) is one of the longest-running longitudinal studies of cognitive development in adulthood. Study findings have shown that patterns of cognitive change throughout adulthood are ability specific and demonstrate significant interindividual variability. On average, numeric ability and word fluency decline earlier than verbal meaning, spatial orientation, and inductive reasoning abilities. The study also established that cognitive decline related to normal aging generally does not begin until age 60 years or later and that the rate of decline accelerates throughout the period of age 60 years to age 81 years. The cohort differences in cognitive ability have been examined and have been found to be ability specific. An investigation of predictors of cognitive change in adulthood has revealed the important influences of chronic disease (particularly cardiovascular disease), environmental factors such as education level, and the intellectual stimulation of one's environment and personality style. A cognitive intervention component first added to the study in 1984 demonstrated that cognitive decline could be remediated to earlier levels, and these remediated levels could be maintained over time. Examination of neuropsychological data has indicated that individuals at risk for dementia could be identified at points 7 or 14 years prior.

The SLS was begun in 1956 as study founder K. Warner Schaie's doctoral dissertation at the University of Washington. Follow-up testing cycles occurred at 7-year intervals in 1963, 1970, 1977, 1984, 1991, and 1998, with new participants sampled and added to the longitudinal sample that could be resampled at each testing interval. The original sample in 1956 consisted of 500 individuals sampled from the membership of a health maintenance organization (HMO). By 1998, more than 4,800 members of this HMO, representing 13 birth cohorts over the average age range of 25 to 95 years, had been tested at least once as part of the main component of this study, and 38 people had participated in all seven waves. Early work by Schaie contributed to an understanding of the confounded nature of age, period, and cohort effects and to the differential conclusions that can be reached about development from cross-sectional and longitudinal data collections.

The longevity of the SLS has been due in part to the ability of the study to expand in order to take advantage of new methodologies and to answer new and important questions. The basic test battery used in the first four data waves (1956–1977) was augmented in 1984 with multiple indicators of each cognitive ability to examine these abilities at the latent factor level. In 1984, an intervention component was also added to the SLS to investigate whether decline in inductive reasoning and spatial orientation abilities could be remediated. Later waves also examined whether gains due to cognitive training were maintained over time in these older adults. In 1989, a data collection was started for the adult offspring and

siblings of SLS participants to examine family similarity in cognitive change. By the 1996 follow-up, over 1,800 family members had been tested at least once. Neuropsychological testing of participants over age 60 was added in 1997, along with the collection of blood data, to examine early detection of dementia. In 2001, grandchildren of SLS participants were tested for the first time, providing three generations of cognitive data for some families. Additional measures have also been added throughout the study history to examine certain areas (e.g., personality, health behaviors, health records, and family environment) in greater detail. With its rich database and history, the SLS continues to be a major source of information about adult cognitive development.

—Grace I. L. Caskie

See also Longitudinal Research

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SECOND LANGUAGES

A bright-eyed, anxious, yet excited kindergartner is accompanied by his parents to his first school experience; as his teacher greets his parents, the mother soon realizes that his first language is not that of the school. The teacher assures his parents that he will adjust well and that in a few months he will be speaking the language of the school. A college student interested in becoming a teacher in New York City majors in Spanish and education; a year before her graduation, she applies to and is accepted into a language immersion program where she will live with a Mexican family for 6 months. She is confident that when she returns to New York City, she will be proficient in Spanish. A recent immigrant, excited by all the possibilities of success in America, tries to find employment but realizes he needs to learn English in order to obtain decent employment. He enrolls in an evening class to learn English, believing that within a couple of months he will know enough of this language to obtain employment. However, second language acquisition is a complex and multifaceted process that is affected by factors such as sociocultural beliefs, educational background, proficiency in the first language (language spoken in the home), personality traits, and intellectual abilities.

WHAT IS SECOND LANGUAGE ACQUISITION?

Over the past 20 years, research findings have begun to offer a clearer picture of how children and adults acquire proficiency in a second language and how this process affects learning and achievement in school. Learning a second language is a long process, and not every person learning a second language achieves native-like proficiency. Most second language learners acquire second language skills through social interactions with peers, siblings, parents, coworkers, and teachers. In 1982, Stephen Krashen, in his writings on second language acquisition, identified five stages. These stages include the following.

Preproduction

In this stage the person is developing comprehension skills even though expressive skills in the second language are minimal. Listening is key since the person is now starting to associate sound and meaning. Sometimes individuals spend more time listening than talking, so this period is also known as the silent period; it may last a couple weeks or several months.

Early Production

Adults, parents, and teachers may find that in this stage, the individual comprehension and word usage in the second language is beginning to increase. One or two word utterances or short phrases are common, such as “How are you?” or “Good morning!” The person may mispronounce words, and this is typical of this stage.

Speech Emergence

In this stage, the second language learner is now starting to use longer and more complex sentences or phrases. The person is also starting to create his or her

own sentences and can now retell stories in the second language. However, grammatical mistakes that are associated with transferring the rules from the first language to the second language are common.

Intermediate Fluency

Of particular note in this stage is the individual's ability to produce more connected or longer sentences. The second-language learner may comfortably engage in conversations with native speakers of the second language. However, even though understanding and usage of the second language have progressed and the person makes fewer grammatical mistakes, he or she still processes information more slowly in the second language. This means that compared with native speakers of the second language, the individual is slower in fully understanding information received and needed. This happens because the second language learner is probably still translating information from one language to another in order to understand the communication.

Advanced Fluency

This is Krashen's final stage. During this stage, the second language learner demonstrates better receptive (understanding) and expressive (spoken) skills in the second language. Nevertheless, the learner still continues to process information at a slower rate in areas of recalling and acquiring information. The action of processing information in a second language demands time and practice and may persist for years.

For children in school, this means that children who are second language learners may take a little more time understanding classroom demands and instruction even though they may seem to speak the second language well. Moreover, Jim Cummins, who studied second language acquisition issues in Canada, identified different facets of language proficiency. He noted two different aspects of language proficiency: basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP). Cummins described BICS as the manifestation of language skills in everyday communicative context. It refers to those language skills that are necessary for day-to-day interaction, and it is a superficial fluency that second language learners acquire through interaction with peers, co-workers, and teachers. It can be referred to as a social language. For example, the individual can speak about the weather, favorite foods, and hobbies; give simple directions; and order items in a store or restaurant. Acquiring BICS may take 2 to 3 years. CALP is the second aspect of language proficiency. It refers to the type of language proficiency that is necessary for learning at the same rate as native speakers. CALP refers to vocabulary, higher-order reasoning, and problem-solving skills in the second language, and it transcends the social language. CALP is associated with literacy in the second language, and its development impacts on achievement. Cummins stated that it takes 5 to 7 years to develop CALP. This means that acquiring proficiency in a second language, which includes literacy skills, requires at least 5 years.

Second language learning involves a developmental progression through various patterns of language usage. This normal process brings about several patterns of language use; these are interlanguage, fossilization, code switching, interference, and language loss.

Interlanguage refers to a separate linguistic system that has a structurally intermediate status between the native and second language. It results from a learner's attempt to produce the second language and it includes a combination of linguistic rules adapted from both languages.

Fossilization is defined as specific second language "errors" or incorrect linguistic forms that remain firmly rooted despite good proficiency in the second language. It is a normal aspect of second language acquisition. It is believed that once a second language learner gains sufficient facility in a language to function in the mainstream culture, the individual stops learning because the level of motivation has decreased.

Code switching is a kind of verbal interaction in bilinguals in which a person switches from the grammatical system of one language to another at the word, phrase, or sentence level. Code switching is a very common occurrence in bilinguals; it is not necessarily a sign of weak proficiency. Moreover, very fluent bilinguals code switch; it can be used as a way of expressing cultural solidarity and to show close ties.

Interference occurs when communicative behaviors from the first language are transferred inappropriately to the second language. Interference from the first language can be found at the level of pronunciation, vocabulary, and meaning.

Language loss refers to the process of losing proficiency in the native language. It is often evident in young second language learners whose first language was neglected to teach the second language. It occurs when

a child had inadequate linguistic models, experiences, and instruction in the first or native language.

WHAT FACTORS FACILITATE SECOND LANGUAGE ACQUISITION?

Over the 20 or more years of studying second language acquisition, researchers have found that there are several factors that mediate or influence this process. These factors include proficiency in the first language, educational background, intellectual abilities, personality traits, and sociocultural beliefs.

Proficiency in the First Language

In his work, Cummins found that highly proficient skills in the first language facilitate learning in the second language. A child or adult who has a rich vocabulary and expressive skills in the first language will acquire a second language more quickly because a good language foundation makes it possible to just transfer information from one system to another. On the other hand, if an individual's first language skills are weak, this person will find it more challenging to learn a second language since most of the information is being encoded for the first time.

Educational Background

The ability to read and write in the first language improves a person's ability to develop proficiency in a second language. This occurs because it seems that the common underlying language structures between two languages allow children or adults to transfer information from one language system to another. When children enter a school with very little education in their native language, they often experience great obstacles in learning a second language and in acquiring literacy skills in that second language.

Intellectual Abilities

Intellectual or cognitive abilities play a role in second language acquisition under two conditions: when a person has deficits in cognitive abilities and when children are placed in educational programs in the second language where they do not continue to grow intellectually in their first language. A person who has deficits in intellectual abilities will experience difficulty learning as a whole; thus, learning a second language can be an arduous process. Carlos Ovando, Virginia Collier, and Mary Carol Combs have done extensive research on second language acquisition, bilingual programs and instruction, and achievement of language minorities. These scholars emphasized that it is critical to facilitate children's cognitive growth in the child's first language at least through the elementary grades because extensive research has demonstrated that children who reach full cognitive development in two languages enjoy intellectual advantages over monolinguals. For children, linguistic, cognitive, and academic developments need to be addressed equally in both first and second languages.

Personality Traits

An individual's self-esteem and his or her motivation to learn a second language contribute to the process of acquiring a second language. Other factors that play a significant role are personality factors such as whether a person is outgoing or extroverted as opposed to someone who is shy or introverted. An outgoing individual will be more comfortable taking risks and expressing himself or herself in the target language. This individual will probably socialize more with native speakers and expose himself or herself to situations that facilitate learning the second language. On the other hand, an introverted person may experience more anxiety and may take fewer risks. A high level of anxiety and discomfort interferes with learning because it not only impairs memory but also decreases the learner's willingness to practice the new language. Therefore, the optimum situation for second language acquisition will be someone who is outgoing, not afraid to take risks, and who is confident and motivated to learn a second language.

Sociocultural Issues

According to Grosjean, language is not only an instrument of communication, it is also a symbol of social or group identity. As such, language is accompanied by attitudes and values held by its members. The willingness to learn a language to identify with a particular social group can be a motivating factor to acquire a second language; conversely, a strong motivation to be accepted by a social group that does not participate in the mainstream culture can become a barrier to gaining second-language proficiency. In

other words, if an individual lives in a society that rejects his or her native language or views it in disfavor, this attitude may influence the individual's willingness to learn the second language.

SUMMARY

Second language acquisition is a complex and multilayered process; it takes at least 7 years with appropriate linguistic models to achieve a level of proficiency to support literacy in the second language. Having a strong first language facilitates learning a second language. Moreover, there are other factors that facilitate acquiring a second language, such as being outgoing and motivated, living in a community that encourages learning the second language, demonstrating reading and writing skills in the first language, and being provided with the opportunity to continue growing cognitively in both the first and second language.

—Tania Thomas-Presswood

See also Language Development

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SECURE ATTACHMENT

Attachment refers to the quality of the relationship between a child and the child's caregiver. The term encompasses a number of different aspects of parent-child interaction, including the degree to which a child seeks comfort from the caregiver, the preference of the primary caregiver to other adults, proximity to the caregiver while exploring his or her environment, and reaction to separation and reunion with the caregiver.

Secure attachment is one classification of attachment. Securely attached infants use their mother or caregiver as a "secure base" from which they explore their environment. For example, the securely attached infant might crawl away from his or her mother to touch an object, but would periodically stop to turn and look at the mother for assurance. Similarly, the securely attached child will actively explore the environment in the presence of the mother and express distress when separated from his or her mother. Upon reunification of the child with caregiver, the child will seek physical comfort to alleviate the distress of the mother leaving.

Infant attachment is frequently assessed via the strange situation paradigm, developed by Mary Ainsworth, a colleague of John Bowlby. The strange situation paradigm is a method of assessing infant attachment that requires observation of a series of "scenes": the infant and mother playing together in a room; a stranger (i.e., a researcher) entering the room; the mother leaving the infant with the stranger for a brief period; and finally, the mother returning.

Ainsworth observed distinct sets of infant behavior, which she believed corresponded with attachment. The most common three sets of behavior (attachment) were referred to as secure, anxious resistant, and anxious avoidant. The secure child typically demonstrated some distress when the mother left, and welcomed the mother back warmly and sought physical contact when she returned. The anxious resistant child also demonstrated distress at the mother's departure, but would resist physical contact upon her return. Finally, the anxious avoidant child demonstrated less distress at the mother's departure, and would ignore the mother when she returned from the brief separation.

Of the three main classifications resulting from the strange situation, the secure child has received the most investigation. Approximately 65% of North American infants fall into the classification of securely attached. About 20% of North American infants have anxious avoidant attachment, and about 10% have anxious resistant attachment. International research suggests that these percentages are variable across cultures.

Attachment theory has never excluded the father as an attachment figure and allows for multiple attachment figures. However, the mother has most frequently stood as the primary attachment figure in research studies. Although Ainsworth's initial classification of secure attachment only included mothers, further research has measured the relationship between fathers and infants in relation to attachment style and yielded similar results.

The long-term benefits of secure attachment have been demonstrated through longitudinal research. In these investigations, infants with secure attachment, in comparison to those with other attachment classifications, were less aggressive with their caregiver, had higher social competence, were more persistent problem solvers, were better able to elicit their caregiver's help when younger, and had higher self-esteem later in childhood. Additionally, studies have found that securely attached infants score higher on developmental and language development tests. However, more research is needed to be certain that these trends are consistent because other studies have offered mixed results. The confounding variable in these studies appears to be the consistency of the caregiver's behavior across development. Changes in the caregiver's behavior can stimulate change in the attachment style of the child. Consequently, the caregiving environment of the child is important, not just in infancy but throughout childhood.

—Peter K. Stewart and Ric G. Steele

See also Ainsworth, Mary Salter; Strange Situation

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SELF-ACTUALIZATION

Self-actualization is the epitome of maturity. It is indicative of sound psychological health and predictive of a creative, meaningful, and happy life. Self-actualized individuals are self-accepting and spontaneous. They are not inhibited by social pressures but confident in themselves, and thus authentic and unpretentious. They accept themselves for what they truly are and are in this sense honest with themselves. This is not to say that they believe themselves to be perfect and unflawed. Rather, they recognize their imperfections and accept them as part of what makes each of us a unique person. You might say that self-actualized persons are high in intrapersonal intelligence.

Not everyone attains self-actualization. Self-actualization apparently occurs only when a variety of basic needs are fulfilled. The needs that must be met before self-actualization is achieved include very fundamental human needs, such as those for food and shelter, and social needs for affiliation. Self-actualization is itself viewed as a need, albeit what Abraham Maslow called a meta-need. If a person's basic needs are met, he or she is in a position to consider meta-needs (for knowledge, justice, spirituality, as well as self-actualization) and may attain the highest level of human development. Self-actualization is a kind of maturity, a result of optimal development.

One of the most important benefits of self-actualization is its support of creative behavior. In fact, the two theorists who did the most to define self-actualization, Carl Rogers and Abraham Maslow, both felt that creativity was inextricable from self-actualization. Indeed, creative persons are spontaneous, uninhibited, open-minded, and flexible. The relationship is apparent from the other perspective: Self-actualized persons are creative. They may not devote themselves to traditional creative fields and produce notable works (books, works of art, inventions), but they are creative in an everyday sense. Like creative persons, self-actualized individuals are open minded, spontaneous, and autonomous.

Much of the thinking about self-actualization was based on clinical studies and qualitative research. It is not easy to examine self-actualization with more rigorous experimental techniques. Then again, according to Carl Rogers and Abraham Maslow, it should not be studied in that fashion. They felt that experimental methods tend to reduce human potentials and behavior in unrealistic ways. They felt that reductionism precluded an accurate understanding of what it is to be human. It should also be noted, however, that some traditional research studies have supported their ideas about self-actualization. There are, for example,

several correlational studies showing an association between creative potential and self-actualization.

Self-actualization is viewed as the peak of development because it indicates that human potentials have been fulfilled and that the individual is functioning in an optimal fashion. Importantly, Carl Rogers felt that potentials can be fulfilled in systematic or at least intentional ways. He pointed to both clinical therapy and creative work as efforts to fulfill human potential. The clinical technique that best supports such fulfillment and self-actualization is that which uses unconditional positive regard. As this label implies, the key is to provide the client with assurance that he or she is respected as an individual. This in turn will often lead to the client gaining self-respect and an appreciation for his or her own individuality. This individual is likely to behave in a spontaneous fashion and live in an authentic and creative fashion.

Not surprisingly, Rogers suggests that parents and teachers should also provide unconditional positive regard to their children and students. Recall here the developmental aspect of self-actualization: It is a sign of maturity, the epitome of health and growth, indicative of potentials fulfilled. Without a doubt, self-actualization is an admirable human condition and indeed an important target for those working with children (and anyone else who is interested in development). It is, however, a unique kind of development, and not tied to cognitive or social advancement. Parents and teachers cannot assume that self-actualization will occur, even if they are careful in constructing a developmentally stimulating environment. Certain environments may stimulate intelligence, for example, but do nothing for the individual's self-actualization. Parents and teachers can, however, provide the unconditional positive regard and respect that will allow the individual to accept himself or herself as a unique and self-actualized individual.

KEY TERMS

Basic needs. These must be fulfilled before the individual feels the need for self-actualization. Basic needs include food, shelter, and social contact.

Meta-needs. Self-actualization is a meta-need in that it is only felt when basic needs are fulfilled.

Reductionism. An unfortunate tendency, rejected by theories of self-actualization, to study human behavior and potential by separating and simplifying.

Unconditional positive regard. One prerequisite for the development of self-actualization, given by therapists (to their clients) or perhaps parents (to their children). It is a kind of respect for the individual that does not depend on behavior. It is respect that does not need to be earned.

—Mark A. Runco

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SELF-CONCEPT

People think about themselves. This observation is hardly surprising, but it reflects something quite unique and extraordinary about human beings. With the exception of chimpanzees and orangutans, humans are the only animals for which self-awareness has been documented scientifically. Humans are unique in other ways, of course, and there is reason to think that these defining features of human nature are linked to, if not made possible by, the capacity to reflect on one's own behavior, psychological processes, and existence. Self-reflection is more than a fleeting mental state (as it likely is for other primates); rather, it promotes an internalized representation or concept of one's competencies, values, personality traits, social worth, and other personal attributes.

People are not born with a self-concept. The capacity for self-reflection, in fact, does not emerge until children are at least 15 months old (usually older). The developmental onset of self-reflection has been documented in studies that assess signs of self-recognition in response to mirrors, videotapes, and photographs. In the mirror studies, for example, the infant's face is marked in some way (e.g., with rouge), he or she is placed in front of a mirror, and an observer

notes whether the infant responds to the mark by touching the appropriate region of his or her face rather than the mark's image in the mirror. The emergence of self-recognition coincides with other developmental milestones involving cognitive competence (e.g., grammar in language use) and interpersonal behavior (e.g., embarrassment).

Initially, a child's concept of self is defined in terms of concrete attributes (e.g., physical features, emotional states) and is highly malleable and open to influence. Over time, children develop a sense of their competencies, interests, and general response tendencies. The input for this progressively abstract and internalized self-concept is generally considered to be social in nature, with parents and various significant others (e.g., siblings) playing a particularly influential role. Recent research, however, suggests that children's personality, including their self-concept, is shaped to a large extent by their interactions outside the familial environment (e.g., by peers and schoolmates). The primary mechanism in both cases is commonly assumed to be sensitivity to and acceptance of the feedback provided by others about one's characteristics.

Once a self-concept is formed, it tends to resist substantial change. Self-concept maintenance has been traced to various biases in processing social feedback, most notably self-enhancement (selective attention to positive feedback or positive interpretation of ambiguous feedback) and self-consistency (greater attention to and acceptance of feedback that confirms one's current self-assessment), although these biases (and other self-defense mechanisms) have been investigated primarily in adults. The self-consistency bias is particularly interesting, since it implies that someone with a negative self-concept will actively resist or reinterpret positive feedback from others. Although a negative self-concept can certainly prove problematic, self-concept stability in general is considered essential for effective and autonomous functioning. The failure to maintain a coherent self-concept is associated with identity diffusion, promotes uncertainty and ambivalence in social relations, and undermines commitment to long-term goals and persistence in effortful task performance. A stable self-concept is also fundamental for the self-regulation of thought, mood, and action. Because self-concept is defined to a large degree in terms of values, it provides a frame of reference for evaluating courses of action and thus enables the person to resist impulse, temptation, and peer pressure. A unique set of "self-conscious" emotions is associated with the evaluation of one's behavior against internalized standards and values. By late childhood, children are capable of experiencing such uniquely human affective states as embarrassment, guilt, and shame. The concern with avoiding (or escaping) these states provides a hedonic basis for moral action.

Self-concept, in sum, is a uniquely human characteristic that underlies a host of other psychological processes that distinguish our species. Contemporary research is exploring the evolutionary origins of self-concept. Another recent approach adapts the concepts and methods of dynamical systems theory to investigate the emergence and maintenance of coherence and stability in self-concept.

—Robin R. Vallacher

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SELF-EFFICACY

Self-efficacy is the belief that one can accomplish certain goals. This belief is important not only to begin planning goals, but it also plays a significant role in attaining those goals.

This belief is a domain-specific belief. Individuals have self-efficacy in a given task in a given situation. Therefore, high or low self-efficacy would not be a trait of an individual, but rather a situational aspect in a person's life. For example, a student may have high self-efficacy while taking a math test, but not while taking a spelling test. However, levels of self-efficacy for individuals are correlated across tasks that are not related.

The construct of self-efficacy falls under social cognitive theory. Within this framework, a person is not passive to the environment, but instead takes what is there and manipulates it to create a self. This active role opposes theories that posit that the environment creates the individual with the individual having no say.

WHERE DOES SELF-EFFICACY COME FROM?

Six sources interact to produce self-efficacy: (a) performance experiences; (b) vicarious experiences; (c) imaginal experiences; (d) verbal persuasion; (e) physiological states; and (f) emotional states. These six sources affect the individual either distally or proximally. Distally means that something happened in the past that has left an impression on the individual that will affect his or her present and future thoughts and actions. Proximally is something that is happening in the present that will affect his or her present and future thoughts and actions.

Performance experiences are the experiences one has had while attempting to attain either a previous or current goal. With a strong background and success in goal achievement in a particular area comes high self-efficacy. Vicarious experiences come from observing someone else attempting to accomplish a task, comparing yourself to that person, and then considering how successful you would be at accomplishing that same task. If you perceive yourself as doing well, you would have high self-efficacy, but if you perceive yourself as performing poorly, you would have low self-efficacy. Imaginal experience is you perceiving your ability to achieve a certain task. Through this creative thought process, your imagined belief dictates your self-efficacy. Verbal persuasion comes from outside sources. This is when another person or group tells you that you have the ability or inability to achieve some tasks. Physiological arousal, whether positive, negative, or neutral, plays a role in self-efficacy. Individuals in a negative state are more likely to have doubting beliefs in themselves; however, when they have neutral or positive physical arousal, they will be more self-confident, thus increasing self-efficacy. Emotional states influence self-efficacy depending on whether one is in a positive or negative mood. In a negative mood, individuals are more likely to doubt themselves, and contrarily, in a positive mood, individuals have more confidence and more self-efficacy.

SELF-EFFICACY AND ITS EFFECTS ON BEHAVIOR

Self-efficacy plays a significant role in shaping behavior and does so through four mechanisms: (a) goal setting; (b) cognition; (c) affect; and (d) selection of environments. Goal setting is a necessary part of human functioning, and if individuals have a high sense of efficacy in a given area, they will be more able and willing to create goals in a certain domain. Contrarily, if they have a low sense of efficacy, they will be more likely to flee from a challenging situation and not create the goals that are necessary to succeed.

Cognition, a necessary mechanism for problem solving, is influenced by self-efficacy. With strong efficacy, individuals believe in their own abilities to succeed in life domains. This allows them to be efficient problem solvers and good decision makers.

Self-efficacy also has a strong connection to affect. With high self-efficacy, individuals in a difficult situation will have positive emotional responses. With low self-efficacy, they experience anxiety and possibly despondency or depression when considering highly desired goals that they believe they will not be able to achieve.

With a high level of self-efficacy, individuals are more likely to select more uncommon environments. They will have the beliefs in themselves that will allow them to try new places and experiences. Individuals with low efficacy would be more likely to stay in the environment that they are comfortable in.

HOW SELF-EFFICACY IS INCREASED IN A GIVEN ENVIRONMENT

Beliefs regarding one's efficacy are continually shown to play a significant role in both motivation and goal attainment. The greatest way to increase an individual's efficacy is through mastery experience. This comes via successfully reaching a difficult goal. Individuals who are able to struggle through a given situation and then achieve what they were pursuing will have more self-efficacy in this area and therefore will be able to face another challenge in this domain. The struggle creates the belief that they will be successful regardless of the challenges. If they were to not be successful in their goal attainment, they would have decreased efficacy, believing that goal attainment is not possible since it did not occur previously.

In the changing state of families, going from nuclear to family members having multiple work duties (e.g., working and taking care of the family), perceived efficacy in these multiple roles has become paramount. Women's beliefs that they can be successful at managing their careers and managing their home lives have more of an effect on both health and emotional strain than family income, occupational workload, or division of child care responsibilities. Also, when parents have a strong sense of efficacy, they are able to increase their children's competencies.

In school, self-efficacy is important in regulating students' abilities to be able to successfully learn and achieve what is desired. Academic development is regulated by three forms of beliefs. The first is students' perception of how well they can achieve understanding of scholastic subjects. The second is the teachers' belief that they can motivate and successful get across the information to the students. The third is the collective belief of the faculty and staff that the program can be successful at having students learn what is being taught.

Career development is another area that is significantly influenced by self-efficacy beliefs. When individuals must decide what careers to look at, their perceived beliefs about what they can accomplish determine what occupations they will perceive as being attainable and what is beyond their ability. Perceptions regarding the ability to navigate learning opportunities influence their belief that they can successfully complete the schooling required for a given field.

In the health arena, efficacy plays an important role in two life aspects. When coping with life stressors, efficacy dictates how successfully an individual will cope with them. Under the biopsychosocial model, where health is affected by both psychosocial and biological factors, life stressors have become ever more a priority when examining individual health. If individuals are able to deal with stressors more successfully, their health will be better than if they were not. The other area of efficacy in health is the perception that individuals can regulate their behavior. Individuals' perceptions of their ability to both control what they eat and control their activity level and types of activity is important to their physical health.

RAISING SELF-ESTEEM

Self-esteem is the discrepancy between where individuals believe they are and where they want to be. Therefore, individuals who have an ideal of where they would like to be and are close to that ideal have high self-esteem. The notion of self-esteem is much broader than that of self-efficacy in that it is not domain specific, but encompasses the whole person.

It has been shown that individuals who are praised, succeed in learning a new ability, or went through psychotherapy have an increased level of self-esteem. Another way to increase self-esteem is for individuals to attain goals. In one study, there were three groups. The first group was told to complete certain tasks. This group attained goals, which resulted in increased levels of self-esteem. In the second and third groups, participants either participated in psychotherapy (group two) or decreased their goals (group three). Participants in both of these groups had lower levels of self-esteem than the group that attained goals.

Other programs have been developed to create increased levels of self-esteem in at-risk youth. Training in some of these programs includes sessions on self-discovery, peer pressure, personal power, drug and alcohol information, and decision making. Participants learn about what positive aspects they see within themselves along with what positive aspects others see in them. Prevention strategies are created so that individuals can learn better ways of coping with pressure to participate in drug use. Also, awards are given to participants to let them know how successful they are within the program. The hope is to increase participants' self-esteem so that they will be able to be successful and be able to resist the pressure of harmful behaviors.

—Daniel W. Cox

See also Bandura, Albert; Self-Esteem

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SELF-ESTEEM

In Ernest Becker's *The Birth and Death of Meaning*, he writes "If you . . . want to understand directly what is driving your patient, ask yourself simply how he thinks of himself as a hero, what constitutes the frame of reference for his heroic strivings—or better, for the clinical case, why he does not feel heroic in his life" (p. 77). This quote captures how central our heroic strivings, or in psychology terms, our self-esteem, can be to who we are and what we do. Indeed, self-esteem, our feeling of worth and value as a person, is of considerable psychological importance and, in that light, it is not surprising that it is one of the most widely researched topics in psychology. Having high self-esteem is associated with a wide range of positive outcomes, and although the pursuit of self-esteem may also have its costs, it generally contributes to peoples' psychological and physical health.

The development of self-esteem begins early in childhood and is a lifelong, fundamentally social process that often involves considerable psychological effort and defense to maintain. There are different types and contingencies of self-worth, and the culture in which we exist plays a large role in influencing how we seek to feel good about ourselves.

WHAT IS SELF-ESTEEM?

Self-esteem is often defined as the general attitude or feeling that one has about oneself. William James, the father of a great deal of psychological theorizing, suggested that self-esteem is the result of one's "pretensions," or what one aspires to be, divided by one's successes (or how much one reaches the goals to which one aspires). Similarly, many psychologists define self-esteem as living up to the standards that you, based in large part on cultural values, associate with being a good or significant person.

Self-esteem is often conceptualized as a relatively stable trait, a dispositional characteristic wherein some people may generally—across different time periods—have higher self-esteem whereas others generally have less positive self-regard. Self-esteem is also conceptualized as a state, a situational quality that is temporally raised or lowered by the events that we experience. An employee getting a promotion, or a student getting a good grade on a test, or an athlete playing well may temporally make the person feel better about himself or herself. Of course, this also implies that when an employee is denied the promotion, or a student fails the test, he or she may temporally experience a threat to his or her sense of self-worth. Such experiences can then lead to a variety of psychological defenses that are directed toward bolstering or maintaining an overall sense of self-esteem.

WHY DO WE NEED SELF-ESTEEM?

There are many different reasons why people need self-esteem, but at a very basic level some theorists argue that we need self-esteem because it conveys to us that we are special people and this in turn provides a deep sense of security. People, psychologists point out, have evolved a sufficient level of intelligence that we are aware of our inevitable mortality and all the precariousness of life. This type of awareness can lead to a considerable potential for anxiety. We seek to quell this potential for anxiety by maintaining beliefs that we are valued people that live in a meaningful world. This conveys a sense of order and purpose to our lives. Thus, self-esteem reflects the successful maintenance of these beliefs and therefore serves a fundamental anxiety-buffering function. Some researchers also suggest that we need self-esteem because it conveys to us that we are accepted by others.

HOW DO WE DEVELOP SELF-ESTEEM?

The development of self-esteem begins early in a person's life. At birth, human infants are profoundly immature in terms of their ability to take care of themselves. This state of infantilization means that humans are from birth completely dependent on their caregivers to provide for their basic needs and facilitate their survival. Because of this dependency, the child learns to associate doing what the caregiver wants and pleasing the caregiver with security (and ultimately self-esteem). When Mommy, for example, tells us not to jump on the sofa with our muddy shoes and

we refrain from dirtying the decor, we often receive praise and love and this makes us feel secure. When, however, we persist in jumping on the sofa, Mommy may become upset and the ensuing absence of at least overt affection can increase feelings of insecurity. The caregivers thus constitute the basis of the developing child's sense of what it means to be a good person. They communicate to us to what is acceptable and valued behavior and what is unacceptable and bad behavior. As the child develops, the basis for what it takes to be a valued person transfers from the caregivers' standards to those that are drawn from our larger social groups and culture. In this way, the process of developing and maintaining self-esteem begins as, and continues to be, a fundamentally social endeavor.

HOW DO WE MAINTAIN SELF-ESTEEM?

We maintain self-esteem by living up to the standards that we associate with being a valued person. However, we inevitably encounter situations that threaten our sense of value (as when, for example, a student does poorly on an examination), and in such situations people will often employ a variety of psychological defenses to maintain self-esteem. Rather than interpreting such experiences accurately, we often interpret them in ways that reflect a self-serving bias; that is, we interpret experiences in a way that reflects favorably on our own sense of value. Thus, for example, our student who did poorly on the examination may explain this poor performance not by a lack of abilities, but instead attribute it to the teacher designing a poor test, bad luck, or some other external excuse. Indeed, in certain situations, people may go so far as to self-handicap themselves, to sabotage their chances of success so as to create a handy excuse for a failure they might experience (e.g., partying all night right before a test, so that if I subsequently do not do well I can blame it on the after-effects of the partying).

Because self-esteem is a fundamentally social process, a large part of our self-esteem maintenance efforts involve other people. When other people like us, this may often make us feel good about ourselves. And when others dislike us, this can pose a threat to our self-worth. Furthermore, we often try to associate with groups that support our sense of self-worth and reflect positively on us, and avoid associations with groups that do not support our sense of self-worth and reflect negatively on us. These are just a few of the many ways in which people can try to maintain a positive sense of self-esteem.

ARE THERE DIFFERENT TYPES OF SELF-ESTEEM?

In recent years, research has caught up to classic psychological theory to indicate that there is more to self-esteem than whether it is simply high or low. Rather, it is important to consider the stability of people's self feelings (i.e., how much they fluctuate over time), the contingencies of self-worth or domains from which people derive feelings of self-esteem (e.g., does a person get their self-esteem from being a student or a spouse), as well as the broader distinction of whether people get their self-esteem from doing what they personally value or whether they get it from doing what other people value. In addition, capitalizing on developments in technology, researchers also examine how people may have conscious feelings of self-worth (e.g., feelings about their self they can report) but also unconscious feelings of self-worth (i.e., feelings about the self of which they may not be aware). These distinctions may be important for a number of reasons. For example, research indicates that unstable, externally derived self-esteem can be associated with increased defensiveness as one seeks to sustain personal feelings of value, but stable, internally based self-esteem is not.

WHAT IS THE ROLE OF CULTURE IN SELF-ESTEEM?

Another debate in psychological circles concerns the role that culture plays in feelings of self-worth. Do all people in all cultures need to feel good about themselves or does this reflect the typically Western focus on individualism? One view is that while all people seek to have self-esteem, they can do so in very different ways. For example, whereas a person in an individualistic Western culture may derive self-esteem from accomplishments he or she personally achieves, the self-esteem of people in more collectivistic cultures is tied much more strongly to one's group and one's communal contributions to that group. Or as another example, consider that while in the United States many people may gain self-esteem by accumulating wealth, in other cultures far different behaviors lead to feelings of esteem. Thus, one important anthropological

message about self-esteem is to consider that it is culturally relative, in that what confers value in one culture does not necessarily do so in another.

SUMMARY

Self-esteem has been found to be a vital aspect of human social functioning. While much has been learned, there are still many interesting questions about the nature, determinants, and consequences to explore.

—Jamie Arndt

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SELF-FULFILLING PROPHECY

Whether at home, in school, or at work, what others expect of us, the basis of the self-fulfilling prophecy (SFP), can help determine the outcome of our lives.

HISTORY OF THE SELF-FULFILLING PROPHECY

The term *self-fulfilling prophecy* was coined over a half century ago, but gained more universal attention in the 1960s through the research of Robert Rosenthal. Rosenthal gave his graduate students one of two types of rats, designated "maze-dull" or "maze-bright," to run through a series of maze experiments.

Students with the maze-bright rats were told that their rats would perform normally at first, but, thereafter, their performance would improve markedly. The students with the maze-dull rats were told that their rats were not expected to show much evidence of learning. In reality, the rats had been assigned to student experimenters on a random basis—any differences among the rats existed only in the student experimenters' minds (i.e., their expectations).

By the end of the 5-day study, the maze-bright rats had, in fact, performed significantly better than the maze-dull rats. Perhaps more important than how well the rats actually performed was how the student experimenters rated (described) the rats. Maze-bright rat handlers rated their rats more favorably (e.g., described them as being brighter, more pleasant) than did maze-dull rat handlers.

Rosenthal's follow-up experiment with elementary schoolchildren did much to call attention to the SFP among educators. He and his coauthor, Lenore Jacobson, led the teachers to believe that approximately 20% of their students were expected to "bloom" academically and intellectually during the school year.

Of course, there never actually was any scientific basis for identifying which students were designated to bloom. Instead, the designated student "bloomers" were randomly assigned so that the only differences between the bloomers and the rest of the student body were in the minds of the teachers. At the end of the year, the students designated as "bloomers" did, in fact, show intellectual gains.

Upon completion of the school year, when asked to describe the classroom behavior of their students, the "bloomers," from whom intellectual growth was expected, were described positively by their teachers—being happier, more curious, more appealing, and better adjusted. On the other hand, when the students designated as nonbloomers bloomed, and some did, these same teachers described these students negatively—less likable, less likely to succeed in life, less happy.

The results of this study showed the impact of having a Pygmalion in one's life. Pygmalion was the Greek sculptor who loved his ivory stature so much that Aphrodite, the goddess of love, allowed the statue to come to life. In the modern play, *My Fair Lady*,

Professor Henry Higgins, through his expectations, became a Pygmalion for Eliza Doolittle, transforming her from a flower girl to a princess.

STEPS IN THE SELF-FULFILLING PROPHECY

The SFP is a four-step process. The steps are deceptively simple:

Step 1—Person A forms expectations of person B based on a variety of factors—race, gender, ethnicity, body build, given name, etc.

Step 2—Based on these expectations, person A treats person B differently.

Step 3—Person A's treatment of person B tells person B what behavior and achievement person A expects.

Step 4—If person A's treatment is consistent over time, and if person B does not actively resist, it will tend to shape his or her behavior and achievement.

SUMMARY

The three most important words in parenting, teaching, and managing may well be *expectations*, *expectations*, *expectations*. Understanding the SFP is crucial to the acting as a positive Pygmalion in the lives of others.

—Robert T. Tauber

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SEMANTIC DEVELOPMENT

A word is a verbal symbol, or a sequence of sounds, that signifies a referent, or object. A referent, however, is not the meaning of the word but simply the object the word symbolizes. The accumulation of words that adult speakers have is referred to as their mental lexicon, or mental dictionary.

SEMANTIC DEVELOPMENT

Children produce their first word at approximately 1 year old and slowly add an average of 8 to 11 words a month to their vocabularies until they hit the 50-word mark. At around this time, approximately 18 months of age, children display a word spurt, or a dramatic increase in the rate at which new words are added to their vocabulary. By their second birthday most children are producing an average of 300 different words. Children's early words are most often words for objects, known as nominals, words for actions or states. A large percentage of these words are nouns because nouns typically have more concrete referents.

Children's early semantic development is characterized by improper or irregular use of words. Children often engage in overextension of a newly learned word and apply the word too broadly to an array of objects or events for which is it not appropriate. For example, a child may call all four-legged animals a *cat.* Children also engage in underextension of a newly learned word and apply the word too narrowly to only one specific object or event. For example, a child may call only his own cat a *cat.*

Children's early word production does not indicate their level of word comprehension; however, children's comprehension skills develop ahead of their production skills. Therefore, children are able to understand much more language than they can produce on their own. According to Nagy and Anderson (1984), in later semantic development, older children

expand their vocabulary at an average rate of approximately 3,000 new words a year. They are able to understand more complex concepts; can use puns, metaphors, and irony; and come to understand that words can have multiple meanings.

HOW ARE WORDS LEARNED?

In a typical word-learning situation, a mother and child are in the grocery store and the mother says, "I need lettuce, a tomato, and a radish." The child already has lettuce and tomato in his mental lexicon and as such in this situation would understand that *radish* refers to the unknown object the mother is holding. In an example of fast-mapping, the child would then add the word *radish* to his mental lexicon, after only this one exposure to the word.

In this situation, however, *radish* could mean any number of things about the radish such as its color, shape, or leafy green top. With all the possible meanings for *radish,* how did the child come to decide on *radish* as symbolizing the vegetable the mother was holding? Theories have suggested that children use several hypotheses about what a new word might mean called constraints on word learning (Markman, 1991; 1994). The whole-object assumption states that children assume that a word refers to a whole object, and not parts of the object. So, *radish* would refer to the entire radish and not just its color, shape, or leafy green top. The mutual exclusivity assumption states that children assume objects can have one and only one name. Because the child already knew the names for the lettuce and tomato, these objects could not be the radish. The taxonomic assumption states that children assume new words that extend to other members of the same taxonomic category. So, the child may assume that a turnip is also a radish because it has the same leafy green top. In addition to these proposed early constraints on word learning, once children have acquired enough language, they can use the context in which a word appears and grammar to determine a word's meaning.

—Susan J. Parault

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SENSATION SEEKING

Sensation seeking is a personality trait that is characterized by the tendency to seek varied and novel sensations and experiences. These experiences may include participation in risky physical activities (e.g., mountain climbing or dirt bike racing), an attraction to novel political and philosophical ideologies, or experimentation with both licit and illicit drugs. Individuals vary in their level of sensation seeking, with some people displaying high levels of sensation seeking and others showing low levels of this trait. However, most individuals fall somewhere in between.

Marvin Zuckerman is the psychologist credited with developing the theory of sensation seeking. He suggested that sensation seeking is composed of four general tendencies: thrill and adventure seeking (TAS), experience seeking (ES), disinhibition (DIS), and boredom susceptibility (BS). TAS is characterized by a desire to engage in activities that involve speed or danger. Examples of such activities include bungee jumping, downhill skiing, and mountain climbing. Whereas TAS is expressed through physical pursuits, a second dimension of sensation seeking, ES, reflects the need for novel personal or inner experiences. With this type of sensation seeking there is a preference for new and different experiences that might be achieved through travel to exotic destinations, interaction with people from different cultures, or learning about new philosophies. A third component of sensation seeking, DIS, is characterized by the expression of reduced social restraint. Individuals with this behavioral tendency are less constrained by societal norms and mores so they are more experimental with regard to their behavior. They often report having many sexual partners and may also indicate that they engage in illegal drug use or gambling. However, these individuals also tend to be more creative than those lower in sensation seeking. The final dimension of sensation seeking is labeled BS. BS occurs when an individual reports distaste for anything routine or predictable. Instead, individuals high in BS seek out new people to interact with along with new experiences. Perhaps not surprisingly, people high in this type of sensation seeking often have problems maintaining long-term personal relationships, but they do well in professions involving changing environments (e.g., aviation).

The behavioral tendencies associated with the trait of sensation seeking are thought to reflect underlying

neurochemical processes. Specifically, higher levels of sensation seeking are associated with lower levels of monoamine oxidase (MAO). MAO is an enzyme that is involved in the regulation of monoamine neurotransmitters, including serotonin, dopamine, and norepinephrine. Collectively, the monoamine neurotransmitters influence arousal and behavioral approach and avoidance tendencies. Research has shown that MAO levels are at their lowest point during adolescence, while the trait of sensation seeking tends to be at its highest. There is also a reliable sex difference in MAO levels, with males displaying lower levels of the enzyme than do females. Research with infants as young as 3 days old has documented this effect. Males also tend to report higher levels of sensation seeking than do females.

Biometric studies of sensation seeking suggest that there is a strong heritability component of this dimension. Estimates suggest that approximately 55% to 60% of the variance within the trait of sensation seeking is due to genetic factors. For example, research examining correlations of sensation seeking scores of identical twins reared apart, compared with identical twins reared together, showed that the association was essentially the same across both groups (r = .59). This finding indicates that genetic factors make a greater contribution to one's level of sensation seeking than does one's family environment. Furthermore, while the remaining 40% variance of the trait of sensation seeking is believed to be environmentally influenced, the influence is believed to reside in environmental factors outside of one's family environment. Specifically, it has been suggested that the culture in which one is raised, along with one's peer influences, contribute to the development of sensation seeking.

—Rhonda Swickert

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SENSITIVE PERIOD

The concept of a sensitive period refers to a period of time in development during which certain internal or external events have effects that the same events do not have at earlier or later developmental stages. Certain events may determine long-lasting important characteristics of individuals if they occur within a particular developmental period, even if they have no obvious immediate relevance. Furthermore, these effects might not be susceptible to change in later developmental stages, or, in other words, they may tend to be permanent. An understanding of the time periods during which the individual is particularly sensitive to certain life events is important to understand aspects of typical and atypical behavioral development, and to improve child care and intervention programs.

Some developmental theorists have argued that there are psychological processes that may occur only within precise temporal windows of opportunity, called critical periods. The hypothesis of critical periods was borrowed from embryological studies indicating that, within a critical period, organ tissues tend to differentiate according to adjacent cells. Once the critical period ends, organ tissues lose their plasticity and become unalterably differentiated. However, research has demonstrated that the limits of the time periods affecting psychobiological developmental phenomena are not as rigidly fixed as originally thought. The term *critical period* was therefore replaced by that of *sensitive period*. The term *sensitive period* is similar to that of *critical period,* but it refers to a time window with limits that are graded, rather than abrupt, relatively malleable, and probably depend on the characteristics of particular individuals and their experience.

The notion of sensitive periods is applicable to early childhood experience as well as to prenatal development. It refers to a period of time when a child is especially receptive to certain kinds of environmental events. Furthermore, certain experiences have to occur within the frame of sensitive periods in order for the

child's development to proceed normally. If the right experiences do not happen during a prescribed sensitive period, critical aspects of development might be enduringly affected. For example, if early social deprivation occurs at the time of the initial attachment of the child to the mother (or to other caretakers), then attachment is not allowed to form. This might occur in infants who live in institutions, under conditions of abandonment, abuse, or neglect. These infants might show impaired social development as early as 5 months of age. Early social deprivation may also have long-lasting detrimental effects in social and emotional situations, as indicated by heightened aggression, delinquency, and indifference to others, and in cognitive functions, as indicated by impoverished language skills and abstract thinking. However, under appropriate conditions, some of these effects might be found to be at least partially reversed in some adult individuals.

Another clear example of sensitive periods comes from the acquisition of language. Peak proficiency in phonological and syntactic aspects of language can be found among those individuals who were first exposed to the target language during early childhood. As age of exposure increases, average proficiency in language declines, beginning at the ages of 4 to 6 years and continuing until proficiency reaches its plateau for adult learners. Adult learners may also have problems in acquiring the phonetic properties that are relevant for being judged as a native speaker. Furthermore, evidence of a sensitive period in language acquisition comes from second language learners whose age of exposure begins after 7 years. Regions of brain activation do not overlap with those that are active during performance of the native language. Second language learners also display less lateralization and high individual variability.

—Santiago Pellegrini

See also Critical Period

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SENSORY DEVELOPMENT

The processes by which an organism experiences and interacts with its world begin with sensation. A stimulus event in the world affects the body by producing changes at the sensory receptors. Psychologists often distinguish between the distal world and the proximal information that activates our sensory systems. For example, while watching a purple rubber ball bouncing (distal event), light energy enters the eye (proximal) and stimulates the photoreceptors, providing color, shape, size, movement, and other information, and sound energy enters the ear (proximal) and stimulates the hair cells, providing sounds that correspond to the ball hitting the ground. The traditional five sensory modalities are touch, taste, smell, hearing, and vision. Other sensory processes include awareness of joint and muscle position, balance, and so forth.

BACKGROUND AND KEY CONCEPTS

The study of sensation focuses on the function of the receptors and sensory systems and emphasizes physiology. A related field of study, perception, focuses on how sensory information is used to understand and interpret the world and emphasizes both physiology and psychology. The field of psychophysics relates changes in physical characteristics of a stimulus, such as intensity, to changes in the perceptual experience of a stimulus, such as brightness in vision or loudness in hearing. One key concept is that of the absolute threshold, which refers to the intensity of a stimulus when it becomes detectable to an observer.

Studying the development of human sensory and perceptual abilities is guided by various theoretical approaches. Some of these include the nativist approach, which emphasizes organization and constraints that are present early in life to guide development; the empiricist approach, which emphasizes the acquisition of knowledge through experience; and the ecological approach of Eleanor and James Gibson, which emphasizes the information provided by a person's dynamic interactions in the real world.

In order to study changes over time in sensory abilities, the key concept of a sensitive period must be considered. A sensitive period typically refers to a time during which certain events or inputs are beneficial for optimal development. In studies of binocular vision in cats, the first 6 months is a sensitive period because interruption of input to one eye during that time diminishes binocular abilities. Clinical studies suggest there is a similar sensitive period for human binocular vision during the first few years of life. More generally, animal studies have indicated that enriched early experiences facilitate neural development.

SENSORY DEVELOPMENT OVER THE LIFE SPAN

In considering the development of sensory abilities, many studies focus on the emergence and elaboration of sensory abilities during infancy and on changes in sensory abilities due to aging.

Early Sensory Development

Despite William James's claim that infants might initially find their new sensory worlds confusing, research studies reveal infants' organized sensory and perceptual abilities. Immediately after birth, a newborn is sensitive to touch and temperature, and also highly sensitive to pain, responding with crying and cardiovascular responses. Studies of taste and smell show that babies respond with different facial expressions, suggesting that certain preferences are innate. They tend to prefer sweeter tasting liquids to salty or bitter liquids, and they can discriminate their mother's scent from others'. Regarding hearing, infants respond to sounds even before birth and appear to be especially sensitive to the frequencies of sounds in human speech and to prefer the exaggerated contours of infant-directed speech. Infants are innately ready to respond to sounds of any language, and become more selectively attuned to their native language later in development. Regarding vision, young infants' visual acuity is about 20/400, which means that an infant can see something at 20 feet that an adult with normal vision could see at 400 feet. Thus, the world probably looks blurry to young infants. They look longer at checkerboards with fewer large squares than with many small squares because of their poor visual acuity. Infants' thresholds for seeing a visual pattern are higher than adults'. Thus, toys for infants are sometimes manufactured with black and white patterns rather than pastel colors because the higher contrast between black and white makes the pattern more visible to the immature visual system. Color vision improves over the first few months of life. By about 6 months, infants' visual acuity improves and approximates adult 20/20 acuity. Sensitivity to binocular depth cues, which require inputs from both eyes, is evident by about 3 months and continues to develop during the first 6 months. Even young infants show preferences for faces and facelike patterns.

Intermodal perception refers to a combination of stimulation from more than one sensory modality. Babies seem to be born with the ability to perceive the world in an intermodal way. For example, infants who sucked on a pacifier with either a smooth or textured surface preferred to look at a corresponding (smooth or textured) visual model of the pacifier. By 4 months, infants can match lip movements with speech sounds and can match other audiovisual events.

Although sensory development emphasizes the afferent processes used to take in information from the environment, these sensory processes can be affected by the infant's developing motor abilities. Reaching, crawling, and other actions allow the infant to see, touch, and organize their his or her experiences in new ways.

Atypical Sensory Development

During childhood, the most common vision problem is myopia, or nearsightedness, which can be corrected with glasses. Regarding more severe visual disorders, legal blindness is defined by acuity less than or equal to 20/200 in a person's better eye. Blindness can occur for various reasons, including damage to the retina of the eye or the optic nerve, or diseases such as glaucoma or cataracts. Congenital blindness refers to blindness that is present at birth. In some cases, newborn blindness results from environmental causes such as rubella or vitamin A deficiency.

Other congenital cases are due to retinopathy of prematurity, retinal diseases, and neural lesions.

Hearing impairments can occur because of congenital problems (abnormal development) and damage to the conduction system of the middle ear. Repeated infections of the middle ear can lead to interference due to accumulation of tissue or to membrane rupture. Hearing impairment and deafness can also occur due to congenital problems and damage to the sensorineural system of the inner ear.

Hearing loss of various severities occurs in about 3 of 1,000 infants at birth, and it is estimated that about half of these cases have genetic causes.

Hearing aids are useful for some children with hearing loss, and a typical communication system for the deaf is American Sign Language. For some people with severe hearing impairment, a cochlear implant can be used to provide auditory input. This electronic device has an external microphone to receive sounds from the environment, an external speech processor that conditions the sounds, and an implanted set of electrodes that transmit electrical impulses to the cochlea to stimulate auditory nerve fibers. In keeping with the idea of a sensitive period for language development, the success of cochlear implants for a person's speech processing and production is often related to the age of the person at the time of the surgery.

Sensory Changes During Adulthood

There are age-related changes in all sensory systems during middle to late adulthood. Touch sensitivity and the ability to sense temperature and vibration tend to decline in older adults. This could be secondary to changes in the skin or circulation.

In vision, the ability to focus on close objects declines from about age 30 on as the lens of the eye changes with age. By about age 40, difficulty with reading small print is common and can often be improved with corrective lenses. Visual acuity and, in particular, night vision can also begin to decline in the middle adulthood years due to physical changes in the eye. The risk for glaucoma, a disease in which increased pressure in the eye affects the optic nerve, increases in middle and late adulthood. Around age 50 to 60, presbyopia ("old eyes") occurs when the lens can no longer adjust well to focus at various distances. In late adulthood, cataracts can develop. These cloudy areas of the lens of the eye can interfere with acuity and, if untreated, can cause blindness. Age-related physical changes in the eye can cause problems in dark adaptation as one moves from a bright to a dark room. Visual acuity tends to decrease with aging, particularly after age 70. Macular degeneration, a leading cause of adult blindness, is due to age-related damage to the retina.

In hearing, sensitivity to sound begins to decrease with aging. About one in six adults in their middle adulthood years in the United States has some hearing loss. The hair cells of the inner ear show age-related changes due to cell death or other factors. Environmental exposure to noise can contribute to hearing loss over time. By about age 50, hearing loss may begin to be evident for high-frequency sounds. By about age 60, the frequencies in the human speech range may be affected and distinguishing a sound, such as speech in a conversation, from background noise may become more difficult. These aging effects on hearing may be more prevalent in men than in women. In late adulthood, hearing shows greater declines, due to hair cell loss as well as to decreased blood supply, membrane stiffening, and neural effects. For some older adults, hearing aids may help to ameliorate some of these declines in hearing.

Changes in the sensory perception of taste and smell occur in late adulthood. This may be due to a decrease in smell receptors, which would affect both smell and taste. There are conflicting descriptions of whether normal aging directly affects these chemical senses, or whether exposure to things such as medicines, pollution, and smoking contribute to the decline. Together, the decline of sensitivity to taste and smell can contribute to a decrease in the enjoyment of food for the elderly.

—Marie T. Balaban and Casi D. Reisenauer

See also Piaget, Jean; Smell

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SEPARATION ANXIETY

Separation anxiety—the emotional distress displayed by infants and young children due to separation from their attachment figure—is one of the most important and salient developmental events in childhood. Separation anxiety begins to emerge in infants around 8 months of age, peaks for most infants around 13 to 15 months of age, and then begins to wane thereafter. Interestingly, even blind infants show evidence of separation anxiety, indicating that they are capable of perceiving the sudden absence of their mother.

The origins of separation anxiety are thought to derive from the adaptive evolutionary value that such a response confers to the infant by keeping the caregiver in close proximity. Cross-cultural data support the evolutionary origins of separation anxiety, indicating that the onset and developmental progression of separation anxiety are similar in every culture tested to date, including China, Japan, Guatemala, and Israel.

Individual differences in the incidence and severity of separation anxiety exist among infants, with some infants demonstrating high levels of separation anxiety and others displaying little or no evidence of it. Researchers have found in a U.S. sample, for example, that only 42% of 11-month-olds and only 79% of 13-month-olds fretted and cried at the departure of their mothers. Thus, even at the peak of separation anxiety—13 to 15 months of age—one of approximately every five infants exhibits little sign of separation anxiety. Research indicates that differences between infants showing varying degrees of separation anxiety are attributable to infant temperament, the cultures in which infants are raised, and the caregiving practices to which they are exposed.

Developmentalists have uncovered several contextual factors influencing the incidence of separation anxiety among infants. For example, infants tend to display less separation anxiety (a) when they are left in the presence of another familiar caregiver such as a parent, a babysitter, or a grandparent, (b) when they crawl or walk away from the caregiver rather than the caregiver departing them, (c) when they are left with a sibling or stranger compared to being left alone, (d) when they are left with toys, (e) when they are left behind with their pacifiers, and (f) when they can hear and see their caregivers in an adjacent room. These findings make it clear that the presence and intensity of separation anxiety depends on the relations between the infant, the caregiver, and the broader social context.

Given the fact that the children's responses to separation are not due solely to themselves as discussed above, what can caregivers do to reduce the frequency and intensity of separation anxiety? Although verbal gestures such as "bye-bye" are ineffective for 1-year-olds, these types of gestures do appease older children. In addition, caregivers can arrange the child's environment to maximize the likelihood that the child will not be distressed upon separation. For example, caregivers may place toys in the environment, leave the infant with a pacifier, or have a familiar substitute caregiver present during the departure. Finally, the caregiver of a child older than about 2 years should avoid physical contact with the child just before departure and explain what the child could do when the parent is absent (e.g., play with toys or watch a cartoon).

Although separation anxiety diminishes for most children and adolescents, approximately 4% to 5% of infants develop separation anxiety disorder (SAD). This disorder is distinguished by abnormal emotional reactivity to real or imagined separation from attachment figures that disrupts activities of daily living. Epidemiological studies indicate that the majority of children and adolescents with SAD are raised by families with low socioeconomic status and many children with SAD refuse to go to school. Pharmacological, behavioral, and psychotherapeutic treatments for SAD have been shown to be effective.

—Matthew J. Hertenstein and Margaret A. McCullough

See also Attachment

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SEX DIFFERENCES

Are boys and girls really different? Are little boys really, as Mother Goose says, made of snips and snails and puppy dog tails? And are little girls made of sugar and spice and everything nice? If the amount written about the topic is any indication, then this question is of prime interest. A search of the PsycInfo database found 44,621 journal citations in English with the key words *sex difference* from 1840 to April 2004.

Psychologists and others who study this topic divide differences into three types: sex, gender, and sex related. Sex refers to classifications based on genetic makeup, anatomy, and reproductive functions and are biological differences. As we shall see, there are very few "pure" sex differences. The second type, gender, refers to the expectations associated with being female or male in social and cultural settings. These are socially determined. The third type, sex-related differences, implies that the behavior corresponds to sex but it does not say anything about the cause or the etiology of the difference. The majority of the differences between boys and girls and between women and men fall within this definition.

PHYSICAL AND HEALTH DIFFERENCES

Physical Characteristics

Some physical differences clearly are sex differences, whereas others are sex related. Males are heavier and longer at birth and have a greater lung capacity and higher caloric intake. They are more vulnerable to physical handicaps. Females are developmentally older at birth, both in skeletal maturation and central nervous system maturation. They mature faster than males, and they live longer. The life expectancy for a white female born in 2001 is 80.2 years, whereas it is only 75 years for a white male. For a black female born in 2001, life expectancy is 75.5 years and 68.6 for a black male.

Large differences in motor skills do not appear until adolescence, when hormonal differences lead to large height and musculature changes in males. Physical performance of motor skills increases with age; however, there is no difference in the curve of boys and girls until about 5 years of age. Then the curve for girls is lower, but the increases are parallel until adolescence. At adolescence boys show a sharp increase, whereas girls level off or decline.

Puberty begins and ends for girls, on the average, 2 years before boys. There is a great deal of variation within each sex in both the age at which puberty begins and the length of time it takes for changes to be completed. Although primarily a biological function, menarche, or first menstruation, occurs earlier in girls who are well nourished, who live in warmer climates, or who have had sexual intercourse.

In terms of external changes, girls may experience their growth spurt at 9 years whereas boys typically begin their growth spurt after age 11. Most girls are at adult height by 14 to 16 years, but most boys do not stop growing until their late teens.

Men, on the average, are taller and stronger than women. Women, on the other hand, have a higher proportion of body fat than do men.

Brain Size

Even after correcting for body size, men's brains are larger than women's brains. The difference is about 200 cubic centimeters or two and a half golf balls. Most of the difference is in white matter, which is primarily nerve fibers and blood vessels. Women's brains contain a larger proportion of gray matter than do men's brains. Research using magnetic resonance imaging technology indicates that men's corpus callosums, the large band of white matter that connects the two hemispheres, is about 10% larger than women's. Again, the excess is primarily white matter. The difference in volume is spread across all the lobes of the

brain such that no one area is larger for one sex. Older women lose less brain volume in old age and do not begin to lose brain volume until an older age than men.

Physical Health

In Western societies, heart disease is the leading cause of death for both women and men. Each year 50,000 more women than men die from cardiovascular disease. However, the onset and progression of cardiovascular diseases occurs earlier in men than in women so that the men who die each year are younger, on average, than are the women. Symptoms of impending heart malfunction are different in men and women. The most common symptom of heart attack for men is chest pain. Although women often experience chest pain, it does not always occur. They may experience indigestion, abdominal or midback pain, nausea, and vomiting in addition to or instead of chest pain. Although 81% of heart transplant patients are men, there are no gender differences in the need for or suitability of heart transplants or in survival rates.

Women who smoke are 70% more likely to develop lung cancer than men who smoke. Most autoimmune diseases affect women more than men, with rheumatoid arthritis, multiple sclerosis, and lupus 75% more likely to occur in women than in men. Although the incidence of type I diabetes does not show sex-related differences, type II diabetes occurs more frequently in women than in men.

There are major sex differences in drug reactions and side effects. Ibuprofen is more effective for pain relief for men than for women, whereas kappa opiate pain medications are more effective for women than for men. Women typically take 7 minutes to wake from anesthesia, whereas men take an average of 11 minutes. Even when they are size matched, women require less alcohol to attain the same blood alcohol levels as men.

Mental Health

Not only do men and women differ in the kinds of physical health problems they experience, but there are differences in the mental health problems they face. Women are more likely to experience anxiety, depression, and neurosis, a relatively benign mental disorder, whereas men are more likely to experience loneliness and psychosis, a severe mental disorder.

In developed countries women are two to three times more likely to have a depressive episode in their lifetime, although recent data from a large national study indicate that the ratio is now 1.74 to 1, suggesting that men's rates are rising. The probability for experiencing an episode in their lifetime is 1 of every 4 women and 1 of every 10 men. Rates in undeveloped countries are equal for women and men and sometimes higher for men than women. This suggests that the underlying causes may be related to psychosocial factors. The preceding data aggregate all forms of depression. However, rates for bipolar disorder, which is a genetically linked disorder, differ from rates for major depression, which stem either from social factors or from an interaction of social and biological factors. The ratio for major depression is somewhere between three to four women for every man. There is no difference in the ratio of women to men for bipolar disorder.

A far too common outcome of depression is suicide. Here the sex-related difference does not reflect that of depression. Suicide is twice as likely among men as among women.

An interesting incidence of sex-related difference occurs in the mental health diagnosis of multiple personality disorder (MPD). North American women are at least three times more likely than men to receive an MPD diagnosis. In Switzerland one study found that 51% of the MPD diagnoses were given to men.

Summary

Sex differences in size and viability appear at birth. Physical differences occurring later in life are more likely a result of an interaction between biological and social factors. There is strong support for the role of social factors in major depressive disorders, although biological factors have an important role in the disorder. As evidenced by the cross-cultural work on MPD and on depressive disorders, psychological diagnoses do seem to be culturally determined.

SOCIAL DIFFERENCES

Traits

Of particular interest is whether women and men differ on personality traits. Men are higher on instrumental traits (e.g., assertiveness, independence, ambition, and the need to dominate), whereas women are higher on expressive traits (e.g., sensitivity to the needs of others, altruism, warmth, and cooperativeness).

Empathy

Although girls and women are believed to be more empathic, research indicates that this depends on how you measure empathy. If you ask people how they feel in certain situations (e.g., "Does seeing someone cry upset you?"), women report more feelings of empathy. However, when physiological reactions are measured or behaviors are observed unobtrusively, no sex-related differences are found.

Helping Behavior

Prosocial behavior, or behavior that is intended to benefit someone else, is a part of the feminine stereotype of nurturance and support. However, research generally finds few differences in helping behavior in young children. When found, the differences typically favor girls who help others more than do boys. Surprisingly the opposite is true for adults. Research indicates that men are more likely to come to the aid of others than are women. This may be a function of how helping behaviors are studied. When individuals are given the opportunity to help a stranger, men are more likely to come to their aid, particularly if the situation is dangerous. When asked about whether they provide psychological assistance and help to friends and family members, women report more helping behaviors. Sex-related differences appear to be greater for kindness/consideration (favoring females) than for instrumental (favoring males) forms of prosocial behavior.

Influence and Persuasion

Women are perceived as more easily influenced and more conforming than men. Social psychologists Alice Eagly and Linda Carli examined the literature and concluded that although there were differences in persuasiveness and conformity, these differences were small. In addition, women were influenced more when the topics were masculine (e.g., sports) and when the researchers were male.

Activity Level

Studies support the stereotype that males are more active than females. However, the difference is small among infants, medium among preschoolers, and large among older children. In addition, the difference is larger in the presence of peers. Boys in groups are much more active than individual boys.

Aggression

Among the most actively debated issues is sex differences in aggressive behavior. The debate focuses on whether differences exist and, if they do, their origin.

Few gender differences in aggression are found in the infancy and toddler years. However, by about age 4 when children begin interacting with others, boys are more physically aggressive than girls. This difference increases over time so that when they begin school there are stable sex differences in the frequency of behavior problems that persist into adulthood. Although there are sex-related differences in frequency of aggressive behaviors, the patterning of these behaviors is similar between the sexes. For both males and females the highest rates of violent crimes occur between the ages of 14 and 24. Men are more likely to commit more serious acts of aggression than are women. The difference seems to be less in quantity of aggression than in type. Relational aggression, where others are harmed through nonphysical hurtful manipulation of peer relationships, occurs more often with girls than with boys.

Psychologists Alice Eagly and Valerie Steffen reviewed studies of adult aggression. They found a small sex-related difference favoring men. The differences were larger in laboratory studies than in field studies that mimic real-life situations. The differences also were larger when physical measures of aggression were used than when psychological measures were used. Men were more aggressive to men than to women. This difference, too, was larger in the laboratory and for physical measures of aggression.

Research on sex-related differences in aggression has focused on differences between the average of the groups. British psychologists John Archer and Karin Westerman asked whether these differences occurred because all boys were more aggressive than all girls or because a few boys were much more aggressive than the average boy or girl. Their study suggests that, at least for 11-year-olds, the differences result from a few individual boys behaving particularly aggressively.

The debate on the origin of aggressive behaviors focuses on biological or social factors. Supporting the biological interpretation is evidence that chimpanzees and boys with higher levels of the masculinizing hormone testosterone tend to be more aggressive.

However, levels of testosterone follow aggressive behavior as well as precede it, clouding this explanation. Evidence reviewed above indicates that levels of aggression do not differ until children begin to interact, suggesting a social explanation. In addition, there is a suggestion that the higher levels of aggression in boys may be due to a few very aggressive boys.

Sexuality

A national probability study asked more than 3,000 adults 18 to 59 years of age about their sexual behaviors. Men reported more frequent masturbation during the past year, and over three times as many men as women reported masturbating in the previous week. More women than men said they had never masturbated to orgasm. Over half of the men reported having more than five sexual partners since age 18, whereas less than a third of the women reported more than five. Other studies report a large sex-related difference favoring men's positive attitudes toward premarital sex, particularly casual sex. Men also are more likely to be accepting of premarital sex and are more likely to have had sex than are women. Although men's attitudes to gay men are more negative than are women's, there is no difference in women's and men's attitudes to lesbians.

Summary

Social differences are primarily sex-related differences. However, it is not clear which differences are primarily socially determined and which are an outcome of social and biological interactions. Differences do occur in traits that are viewed primarily as masculine and feminine, but cross-sex behaviors are common. Evidence on the two closely related areas of empathy and prosocial behavior is not clear, although it appears that situational factors are strong determinants of behaviors in these areas. Again, situational factors appear to be at work in the differences found between women and men in ease of persuasion in that women are more susceptible to persuasion when the topic or the persuader is male.

The last three areas, activity level, aggressive behaviors, and sexuality, are areas where sex differences generally are argued to occur. However, even here the role of biological factors is not unequivocal. Differences in activity level are small early in life but increase in size as children grow older, indicating some influence of social factors. They also are situationally determined, with boys more active in groups than alone. The potential causal factors for aggressive behaviors were reviewed in the topic area and suggest that the evidence does not support either purely biological or social factors. Research on sexual behavior indicates some consistent differences as well as increasing similarities over time.

COGNITIVE DIFFERENCES

Intelligence

Certainly the question of who is the most intelligent has consumed the attention of scientists and laypersons alike. When asked to estimate their scores on intelligence tests, men estimate their scores as higher than do women. On the other hand, girls have higher grade point averages than do boys.

Evaluating sex-related differences in intelligence using standardized intelligence tests is not possible. The tests are developed so that the test questions either sample from areas where there are no sex-related differences or sample equally from presumed female- and male-advantaged areas. Some have argued that the *g* factor, the general ability that is proposed to underlie all aspects of intelligence, can be measured by scores on a variety of tests designed to measure fluid intelligence. Fluid intelligence is considered to be biologically determined. It is the ability to reason and is unrelated to experience. When both adolescents and college applicants were tested on measures of fluid intelligence, no sex-related differences were found.

Sex-related differences are observed more often in the extremes of ability distributions. Males, on average, score higher on the Scholastic Assessment Test (SAT) and the Graduate Record Examination (GRE) than do females. Although these standardized tests are designed to predict grades in college (SAT) or graduate school (GRE), females, on average, get higher grades than do males. Males who earn an A in mathematics class score higher on the mathematics portion of the SAT than do females earning an A in mathematics.

Spatial Ability

Spatial ability is not a single construct. Three distinct spatial skills are studied, and the size of the difference between men and women depends on the type of spatial skills. Men are better on tests of spatial

perception that require one to orient an object in space in relation to his or her body. The difference is of medium size.

Men also are better than women on tests of mental rotation where one must mentally rotate a three-dimensional object depicted in two dimensions in order to match it to a target figure. Women and men are equally accurate at matching the target object, but men perform the task much faster. This difference is large and has been stable in Western societies over a 20-year period. It is found in Asian and African populations as well. However, the male advantage is limited to two-dimensional drawings and disappears with real three-dimensional stimuli. Sex-related differences also are not evident when the participants are not told that it is a spatial task, but are only given directions on what to do.

Women outperform men on tests of embedded figures where one must locate the simple figure inside a complex scene. This is very similar to "can you find the object" games in magazines. The difference between women and men is small, but it is consistent.

Indian psychologist Santha Kumari Kunjayi compared Indian adolescent and middle-aged groups on spatial rotation. Sex-related differences favoring boys were found between adolescent boys and girls. No differences were found between middle-aged women and men, nor were differences found between adolescent boys and middle-aged men. However, middle-aged women outperformed adolescent girls, suggesting that, at least for females, spatial abilities have a learned component.

Although the finding of a sex-related difference favoring males in mental rotation is robust, it is not clear how this applies in the real world. Spatial skills are assumed to account for male's better geographical knowledge and way finding, or the ability to find one's way in a novel environment. In one study, way finding was related to men's scores on a mental rotation task such that those with faster mental rotation scores also completed an orienteering task faster than those with slower mental rotation scores. However, women often performed as well as men on the orienteering task despite having lower mental rotation scores than the men.

Mathematics

Although the common perception is that men are much better in mathematics than are women, a U.S. Department of Education study found that women and girls make higher grades in college mathematics classes. This occurs both in the general college population and in students who have taken more than 10 college credits in mathematics. Other studies have found small differences in specific math skills, with these differences typically favoring men. The exception is that women outperform men in math calculation. Studies after 1974 find smaller sex-related differences than do studies prior to 1974. Recent reviews have found no sex-related differences in mathematical areas such as fractions, ratio/proportion/percent, algebra, geometry, and measurement.

Girls outperform boys on most tests of arithmetic computation. However, on timed tests, boys score better than girls. There is some evidence indicating that girls learn the correct but slower way to calculate, whereas boys more often resort to estimation, a faster approach. On the mathematics portion of the SAT, girls more often than boys correctly answered problems that involved applying formulas. Problems involving logic or estimation were more often solved correctly by boys.

Using a national probability sample, a Canadian study of secondary schoolchildren found no difference in girls and boys' basic skills and knowledge or in their routine or complex problem-solving abilities in grade 7. Although there is a fan-shaped distribution across students' growth in mathematical skills from grade 7 to grade 11 such that the better students improved at a greater rate than the less skilled students, this did not differ by gender. At grade 11 there was no sex-related difference in these skills.

There is one strong sex-related difference that favors boys. Highly mathematically talented junior high students are predominantly male. The most frequent explanation for this is related to intrasex variability. There is some evidence that the range of mathematic ability varies much more between boys than between girls. If this is the case, then it is proposed that even with the small and decreasing difference in average ability between the sexes, the number of males in the upper end of the distribution, or the most talented, may be as many as 12 to every 1 female.

The relationship of mathematics and spatial skills, particularly mental rotation, has been the subject of much speculation and some research. Many psychometricians, the scientists who study mental processes, have long believed that a single mode of thought underlies both mathematical and spatial reasoning,

perhaps causing those who possess this mode to reason differently and more effectively. In a meta-analytic review of the literature, Lynn Friedman, an education psychologist at the University of Minnesota, examined this question. She found that the correlations between mathematical and verbal skills were higher than those between mathematical and spatial skills. Math-space correlations were no higher, and were sometimes lower, than other skills (e.g., social studies and sports information). In addition, math-space correlations were higher in females than in males. Training in spatial skills eliminates sex differences; however, training in spatial skills does not improve mathematical achievement.

Verbal

Differences in verbal ability are observed very early in children. Girls talk about 1 month earlier, develop larger vocabularies, produce longer utterances, and use better grammar than boys. Between the ages of 1 and 5, girls are more proficient in language skills than are boys. By the age of 16 months there is a 13-word difference in vocabulary size favoring girls. This grows to 51 words at 20 months and 115 words at 24 months. This does not appear to be related to a differential rate of mothers speaking to their girls, because they speak as much to their boy babies as to their girl babies.

A small sex-related difference favoring girls and women is found in vocabulary and reading comprehension. Speech production shows a moderately sized sex-related difference that favors girls and women. As with mathematics, the size of the difference is larger in studies conducted prior to 1974 than it is in those conducted after 1974.

An area in which a large sex-related difference exists is writing proficiency. This difference favors girls and women who outperform boys and men at all ages and at all times of assessment. On the other hand, boys outperform girls on verbal analogies.

Memory

On a battery of tests examining different aspects of memory, women were substantially better than men, scoring more than one half of a standard deviation above the men. A similar result occurs on tests of visual memory.

Females score higher on tests of short-term, working, and long-term memory than do males. This difference has been found both in adolescents and in older adults. In addition, females appear to have better memories for spatial locations. Females also have better episodic memory, or memory for events, than do males.

Perceptual Ability

Very early in life some perceptual differences are evident. Girls are able at an earlier age to recognize a new from a previously viewed object and will gaze at a preferred object earlier than will boys. As adults these differences continue. Women see better in the dark than do men, whereas men's vision is better than women's in bright light. There is some evidence that men have mild tunnel vision resulting in greater concentration on depth. Women, on the other hand, have wider peripheral vision. More men than women are color blind.

Infant girls appear to be more sensitive to sound than are infant boys, becoming more irritated and anxious about noise. Girls and women hear better than men, are more sensitive to sound, and are more likely to sing in tune. Auditory acuity varies with the stages of the menstrual cycle.

Women have more touch receptors in their fingertips than do men. As a result they are more sensitive to touch than are men. Even a few hours after birth girls are more sensitive to touch than are boys.

Women have a lower threshold for odor recognition, particularly musk and amyl acetate. They are 1,000 times more sensitive to musk-like odors than are men.

At least early in life, women have a lower threshold for tastes, particularly bitter flavors, than do men. However, one investigator found that the regeneration of taste buds slows down more for women than for men. In older adults, taste thresholds were lower for men for most tastes, particularly sweet tastes.

There is a moderate difference in pain perception with women tending to have lower thresholds than men. Evidence suggests that estrogen, a female sex hormone, and testosterone, a male sex hormone, may be involved. In research with mice, males injected with estrogen appear to have a lower tolerance for pain. The presence of testosterone appears to elevate tolerance for pain in female mice. As usual, however, this is not as straightforward as it appears. When pain perception is examined in more detail, the differences occur only at high levels of neural stimulation.

Culture accounts in part for differences in how men and women receive pain signals. Young boys are

taught not to cry, whereas young girls often are held and cuddled when they are in pain. A study of pain tolerance in children 7 to 14 years of age found that younger boys had the lowest levels of tolerance and older boys the highest levels. Tolerance levels were moderate for girls of all ages, suggesting that, at least for boys, tolerance for pain is learned.

Summary

Although humans have worked hard at determining who is most intelligent—men or women—the use of intelligence tests cannot determine this. If intelligence is some underlying factor guiding the ability to reason, then it is fairly clear that no differences occur between the sexes. However, differences occur in some, but not all, of the areas related to intelligence.

Spatial rotation is used as an explanation for men's superior way finding abilities and their mathematics skills. Although there does appear to be some relation of the ability to mentally rotate objects in space to way finding, the evidence is not overwhelming. The male advantage in mathematics is not as well established as that of spatial rotation. With the exception of highly talented mathematics students and scores on timed tests, the male advantage has lessened or disappeared as girls have been encouraged to take more mathematics classes. Finally, math skills are more strongly related to verbal skills than to spatial skills.

Women have a small but consistent advantage in verbal skills, although in most areas, such as vocabulary and speech production, the size of the difference has decreased in recent years. The female advantage in writing, however, is robust. Where differences occur in memory, the advantage is to women. This difference is found across the life span.

It is likely that many of the differences in perceptual abilities are sex differences. Differences in discrimination, preference, and sensitivity to sounds and to touch are evident from birth. Others vary with the menstrual cycle. Other perceptual differences are more likely gender-or sex-related differences. For example, in orthodox Jewish communities, myopia occurs more frequently in boys, but it is most frequent in those boys who spend as much as 16 hours a day reading. Differences that indicate women have lower physiological threshold for pain than do men may be sex differences, although physiological responses can be learned.

CONCLUSIONS

Evidence of sex differences occur across all the areas examined. Certainly differences that occur at or shortly after birth indicate a biological cause. Differences that do not occur until later in life are more likely to be gender differences. Most differences seem to be sex-related.

An issue that has not been addressed is the size of the differences that do occur. Across all the differences reviewed, most are small to medium. The two largest are in spatial rotation scores and in aggressive behaviors. In the other areas, the differences between men and the differences between women are larger than the difference between men and women. Thus, the real behaviors and abilities of real women and men often overlap, with some men and some women being very much alike in a specific area. Although the difference in spatial rotation is large, it is not clear how this impacts daily life. It may make it easier for men to find their way from one point to another, but women can be trained to the average man's level. Men's advantage in mathematics, with a few exceptions, has decreased to the point that spatial rotation, which has remained robust, is now used to explain a small or nonexistent effect.

—Virginia Norris

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SEX EDUCATION

Sex education, sometimes called sexuality education, is the teaching of information regarding sexual behaviors and their effects. The history of sex education is relatively recent and has been shrouded in much controversy. In the early days of the 20th century, doctors and laypersons could be arrested for disseminating information regarding contraception and family planning. As recently as the 1950s, the topic of sex was not considered appropriate for discussion in polite society and certainly not in public schools. Along with the lifting of other societal taboos, the 1960s brought discussions of sexuality into the public arena and with this, the introduction of sex education into public school classrooms.

CONTROVERSIES

In spite of these public discussions, there remain a variety of controversies. Should we teach sex education in the schools? There are those who believe vehemently that all sex education belongs in the home and those who believe equally strongly that we should rely on schools to provide this information. Between these two extremes are those who believe that parents, at the very least, need to have control over whether or not their children participate in any sex education offered by the public schools. If we are going to teach sex education in schools, what should we be teaching? How effective are the "plumbing" lessons, which teach about body parts and what goes where, with no regard for discussions about the risks and consequences of irresponsible sexual activity? How effective are the comprehensive sexuality education programs versus the abstinence-only programs? In what ways does each of these programs deal effectively with the students who are already engaged in sexual activities?

There are two major divisions in the sex education field that highlight the major controversies.

COMPREHENSIVE SEXUALITY EDUCATION

Comprehensive sexuality education is usually defined as the teaching of information regarding reproductive anatomy and physiology, contraceptive choice, sexual identity, relationships and intimacy issues, and risks and consequences of sexual behavior (e.g., human immunodeficiency virus [HIV] and acquired immunodeficiency syndrome [AIDS], pregnancy, sexually transmitted diseases [STDs]). While comprehensive sexuality programs stress responsible sexual behavior and convey that abstinence is the only guaranteed method for preventing unwanted pregnancies and exposure to STDs, there may also be discussion that includes those teenagers who are already engaging in or will choose to engage in sexual activity. These programs often offer information regarding responsible sexual behavior, safer sex, where contraception can be obtained, and all available alternatives for teenagers who face an unwanted pregnancy.

ABSTINENCE-ONLY SEX EDUCATION

Abstinence-only sex education has as its exclusive purpose teaching the social, psychological, and health gains to be realized by abstaining from sexual activity. It teaches that a mutually faithful monogamous relationship in the context of marriage is the expected standard of sexual activity and sexual activity outside marriage is likely to have harmful side effects. It teaches sexual abstinence outside of marriage is the expected standard for all school-age children and teaches the harmful consequences of having children

out of wedlock. It also teaches young people how to reject sexual advances and how alcohol and drug use increase vulnerability to sexual advances. Finally, it teaches the importance of self-sufficiency before engaging in sexual activity. There is no information provided regarding contraception, safer sex, or sexual orientation.

It should be noted that there is broad disagreement among abstinence-only educators and policy makers about what constitutes sexual activity; consequently there is little agreement about what constitutes abstinence. Since 2000, the focus of the federal government has been on promoting abstinence-only education in the public schools.

TEEN PREGNANCY AND SEX EDUCATION

Based on 2000 census data, the pregnancy rate for teenage women 15 to 19 years of age dropped from 106.7 per 1,000 in 1986 to 83.6 per 1,000 in 2000. The pregnancy rate for all teenagers is mathematically the product of two factors: the proportion of young women engaged in intercourse (sexual activity) and the rate at which these young women become pregnant (lack of effective contraceptive use). The most closely studied and analyzed data on this topic were collected between 1988 and 1995, when the teen pregnancy rate dropped from 111.4 per 1,000 in 1988 to 99.6 per 1,000 in 1995. What the calculations using these data indicated was that roughly 25% of the teen pregnancy rate decline was due to delayed onset of sexual intercourse, while 75% of the decline was due to increased use of highly effective contraceptive methods.

CURRENT SEX EDUCATION POLICIES IN THE UNITED STATES

Highlights of the current state of sexuality education in the United States (as of February 2005) are as follows:

- Twenty-two states and the District of Columbia mandate public schools to teach sex education; many place requirements on how abstinence and contraception are treated when taught.
- Twenty-one states require that abstinence be stressed when taught as part of sex education.
- Nine states require simply that abstinence be covered during instruction.
- Fourteen states and the District of Columbia require that sex education programs cover contraception; no state requires that it be stressed.
- Thirty-eight states and the District of Columbia require provision of STD/HIV education; many place requirements on how abstinence and contraception are treated.
- Twenty-five states require abstinence be stressed when taught as part of STD/HIV education.
- Nine states require that it be covered.
- Seventeen states require that STD/HIV programs cover contraception; no state requires that it be stressed.
- Thirty-nine states and the District of Columbia require school districts to permit parental involvement in sexuality and STD/HIV education.
- Three states require parental consent in order for students to participate in sex or STD/HIV education.
- Thirty-six states and the District of Columbia allow parents to remove their children from instruction.

Most states currently offer parents an opt-out alternative to their children participating in sexuality education programs. However, few parents have their children removed from these classes.

Although the controversies remain, sex education in its varied forms is here to stay. While many experts might agree that parents should be the primary educators for their children, not all parents are educated or comfortable enough themselves to deal with these very difficult topics in a productive manner. Many will continue to rely on the public schools to provide, at the very least, some information regarding sexuality, whether it is a comprehensive or abstinence-only sex education program. The program chosen will be determined by federal, state, and district policies and outcomes desired.

—Shelley Dubkin-Lee and LeoNora M. Cohen

See also Kinsey Institute

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SEXUAL ABUSE

Before the mid-1970s, a great deal of the writing about child sexual abuse did not focus on the severity of the problem or the rates of occurrence. However, during the feminist movement of the 1960s and 1970s, more attention was given to the topic, and since that time awareness of child sexual abuse has increased.

WHAT IS CHILD SEXUAL ABUSE?

There is no universally accepted definition for child sexual abuse; definitions vary in legal versus clinical settings. Discrepancies that arise when trying to define child sexual abuse include variations in the age for how old one considers a child to be, as well as what one believes to be inappropriate sexual behavior. In addition, the capacity of a child to give "informed consent" to a sexual activity and a child's vulnerability to manipulation or coercion are also considered. Regardless of the difficulties in trying to standardize the definition of child sexual abuse, it is often defined based on the types of sexual behavior that occurred, the age and relationship of the offender, and the patterns of the abuse. The sexual abuse of children is illegal in all states in the United States. Most child protection agencies handle only cases in which a caregiver of the child is the abuser.

Types of sexually abusive behavior include noncontact sex abuse, fondling, oral sex, and penile penetration. Noncontact sexual abuse can include sexually explicit comments to the child, solicitation or sexually inappropriate behavior over the Internet, exposure of intimate body parts, voyeurism (peeping), and obscene phone calls. Fondling is when the child is told to touch the offender's intimate body parts or when the offender touches the child's intimate body parts, either of which can occur above or beneath the clothing. Oral sex consists of kissing with or without the use of the tongue, licking, biting, or sucking of the body, breasts, vagina, penis, or the anus. Penile penetration may be performed on the child by the offender, and is when the penis is inserted into the vagina or anus.

A sexual act is typically considered abusive when there is an age difference of about five years or more between the offender and victim, when the event occurs for the pleasure of the offender but not for the victim, and usually when the offender has power or influence over the victim. However, abuse can occur between two children of similar ages.

Patterns of sexual abuse usually fall into one of five categories: dyadic sexual abuse, group sexual abuse, sexual exploitation, sex rings, and ritualistic sexual abuse. Dyadic sexual abuse occurs when there is one offender and one victim and may be present within a family or between persons who are not related. Group sexual abuse can occur when the offender begins by having sex with one victim and eventually is abusing several victims at one time or when there is one or more offenders abusing several victims at one time. Sexual exploitation (also referred to as "human trafficking") occurs when victims are being used as prostitutes or to produce pornography (with the Internet and computers playing a growing role). While sexual exploitation is a problem in the United States, it is an extreme problem in Southeast Asia, Latin America, Western Europe, and the Philippines, due to the poor economic conditions in those countries. Adolescents may be lured by promises of jobs as waitresses, dancers, or hotel maids. Some are openly recruited for the sex trade. Sex rings, in which one or more offenders typically abuses more than one child, are more commonly created by male pedophiles, or persons who are primarily interested in children to fulfill their sexual needs. Ritualistic abuse can occur when

the child is abused physically, psychologically, and sexually in a calculated manner, such as by a cult, in a day care setting, or by a single person.

Indications that a child has been sexually abused can be sexual or nonsexual. Actions that often increase suspicion of child sexual abuse include excessive masturbation by the child, knowledge of sexual activities that are more advanced than appropriate for his or her age, sexual aggression toward other children, sexual advances toward older children or adults, exhibition of inappropriate promiscuous behavior, or presence of sleep, bowel, bladder, eating, emotional, cognitive, and behavior problems. One theory regarding victims of sexual abuse that eventually sexually abuse others is that the victims may feel powerless and out of control, but by creating a situation wherein they are the offender, they feel as if they are gaining an element of control that they did not have during their own abuse.

INCIDENCE/PREVALENCE PATTERNS

The prevalence rates of child sexual abuse are estimated through population surveys conducted over the phone, by personal interviews, and through questionnaires. Prevalence rates can be calculated through information from the victims as well as from volunteers in the field, special populations such as persons in therapy, and samples that are believed to be representative of the population. Different populations, definitions of sexual abuse, and the ways in which the surveys are conducted all may produce varying results in estimates of the prevalence of child sexual abuse. Prevalence rates may not only be more inaccurate than desired because of measurement issues but also because of unreported events, minimizing of the event by adults or professionals due to their own interpretation of sexual abuse, as well as events that are not remembered. Therefore, the reported and actual occurrence rates of sexual abuse may be dramatically different.

In 2002, incidents of child sexual abuse that were reported and confirmed by law enforcement officials or state child protective services were found in 1.2% of children (approximately 88,686 children) in the United States. Furthermore, in 2002, 9.9% of children who had been maltreated, whose cases were investigated and the reports were confirmed, were found to be sexually abused (sexual abuse is less common than child neglect or physical abuse).

However, in contrast to officially reported instances of child sexual abuse, survey or questionnaire studies reveal a higher incidence. Instances of child sexual abuse are typically not reported to legal or child welfare authorities. One study estimated that only one in five instances of child sexual abuse is reported, while another estimate was that only 3% of instances are reported.

Studies of U.S. college students' responses to questionnaires show that about 50% responded that as children they experienced some form of sexual abuse that did not involve contact with their genitals (sexualized kissing, seeing an exhibitionist), and 5% to 10% reported they experienced attempted or completed intercourse. Studies in the United States, Great Britain, Canada, Sweden, and New Zealand provide a wide range of prevalence of child sexual abuse, from 12% to 62% for women, and 3% to 39% for men. The wide range in the prevalence rates is mainly due to the varying definitions employed in the studies and the methods of data collection. Studies in which data are collected in face-to-face interviews by trained interviewers obtain higher reports of abuse than studies using questionnaires or telephone surveys. One study that examined a number of child sexual abuse prevalence studies suggested that the prevalence for the general population (not clinical samples) is between 12% and 17% for women and between 5% and 8% for men. Other researchers conclude that at least 1 in 3 women has experienced sexual abuse during childhood, and at least 1 in 10 men. There is agreement that updated epidemiological studies, employing standard definitions of child sexual abuse and adjustment/outcome measures, are needed.

Research findings suggest that males are more likely to be abused by someone outside of their family than females, possibly because of independence that is given to boys in hopes of creating self-reliance. Research regarding the prevalence rates of men who were sexually abused as children has not been as common as research involving sexually abused females. Underreporting of males who have encountered sexual abuse may be a result of professionals failing to recognize signs of abuse in boys, less supervision of boys than girls, due to the anxiety and stigma that the boy may be "gay" if the abuse were disclosed, or because of cultural training not to express distress to others.

A common problem with the reporting of child sexual abuse is getting the child to disclose that the

abuse is occurring. Some children remember the acts and do not want to talk about them and others are not able to remember them. Often, children who are sexually abused experience repression and are unable to remember the experiences clearly or at all due to the traumatic nature of the incident. This may be an adaptive response for the child, and may be used unintentionally so that the child is able to survive without having to reexperience those memories. Unintentional motivations for memory repression may be to avoid becoming overwhelmed, to avoid experiencing the pain of the event, to maintain some type of relationship with the abuser if necessary, and to avoid threats to how the victim views interactions between persons in the outside world. Experiences in which the person's boundaries are betrayed in a relationship and when the person is terrorized (such as experiencing war crimes or sexual abuse) are more likely to be repressed. Events that are frightening, can physically harm the person, but are not viewed as a betrayal by someone else (such as surviving an automobile accident) are considered terrorizing events, but are not as likely to be repressed. Therefore, it is likely that repression serves as a way to protect the person from the pain of the event and the recognition that relationship boundaries are being betrayed with the abuser and those who are aware that the abuse is occurring. Typically, the more dependent the child is on the person abusing him or her, the more intense the act of betrayal will seem.

Oftentimes individuals intentionally and unintentionally focus on other sensory experiences during sexual abuse. By focusing on other sensory experiences, such as the texture of a fabric or a smell, the person is able to avoid dealing with the traumatic event at that time. However, whatever sensation the person focused on during the abuse is often remembered and paired with the emotions that surrounded the event, even if the actual abusive act is not remembered. Therefore, sensations can act as triggers for flashbacks, or the reexperience of the emotions that were associated with the time when the abuse occurred, even if the abuse is not remembered in its entirety or at all.

IMPACT AND EFFECTS

At the time of initial assessment for child abuse, as many as 40% of children do not manifest clinical symptoms. When a broad definition of child sexual abuse is used (that includes a single incident that was not physically invasive) in college student samples, most people surveyed say they have not experienced significant long-term negative consequences. However, there are quite pronounced negative consequences for some. The effects of child sexual abuse are unique and experienced differently for every victim. When sexual abuse causes harm, it can interfere with normal child development and can increase the risk for emotional challenges or maladjustment in adolescence and adulthood. Distressing symptoms and poorer adjustment are more likely following sexual abuse that was more severe in terms of betrayal, coercion, or physical intrusion. Further complicating the assessment of the impact of sexual abuse is the fact that sexual abuse is more likely to occur in families in which there is violence, conflict, or dysfunction. Therefore, it is difficult to sort out the effects of the sexual abuse from the other sources of distress.

Short Term

The physical, emotional, and psychological effects of the abuse can be experienced for a short period of time after the abuse or can be more pervasive and long lasting, often throughout childhood and adulthood. While threats from the offender are a major reason for children to not report abuse, children also may not speak out because they do not feel they will be believed, they fear that they may anger their parents or caregivers, and they fear that the parents may become angry with the offender and perceive them as "creating trouble." Some other reasons for children to withhold disclosure are the fear that people may believe the child was responsible for the abuse, the fear that the parents could be blamed for allowing the abuse to continue, and the child's ambivalent feelings regarding the abuse. It is not uncommon for children to retract true allegations of sexual abuse because of pressure to recant or due to their distress at the response to the allegations.

After-effects of sexual abuse can be intensified when a trusted adult does not believe or support the child. In response, the child may withdraw and internalize, by directing the painful feelings at himself or herself, or may externalize, by directing the feelings toward others or acting out. The child may fear being stigmatized by the disclosure of the abuse, in that he or she may not be "male" or "female" enough, which can often result in behaviors in girls of being more

passive or "feminine" and boys being more aggressive or "masculine."

Long Term

Long-term effects that are specifically caused by child sexual abuse are unknown due to the lack of reports, individual differences in response to the abuse, and inadequate research populations, among other factors. Many aspects of personality are formed in childhood, and when traumatic events such as sexual abuse occur in childhood, certain characteristics can be formed and maintained on a long-term basis. As time following the abuse increases, children often associate the feelings and fear that were internalized from the abuse with everyday occurrences and relationships that are not associated with it. Many times children feel that it is necessary to be hypervigilant to protect themselves from future incidents. Another common long-term effect of sexual abuse is for the victim to have a less-defined sense of self and low self-esteem, due in part to feelings of alienation, the confusion of emotions, and contradictions perceived in relationships.

Long-term psychological problems that children often experience as a result of sexual abuse include problems with sleep and relaxation, depression, anxiety, negative beliefs regarding their bodies, flashbacks associated with psychological disorders, and an inability to deal with reality, often referred to as dissociation. Psychological disorders that are often experienced by victims of sexual abuse include depression, eating disorders, anxiety disorders, posttraumatic stress disorder (in which the victim reexperiences the traumatic event and may be hypervigilant and may try to avoid stimuli that trigger flashbacks), borderline personality disorder (in which the victim engages in self-mutilating behavior as a means to deal with psychological pain, dissociation, etc.), and the extremely rare dissociative identity disorder (in which the abuse that the victim encountered was so severe that his or her personality during times of the abuse fragmented as a means to cope, creating different alters or "personalities").

Feelings of anger and guilt toward the abuser, especially when the abuser is someone the child feels they should love or care for, can increase the levels of debilitating emotional turmoil for the victim. Victims of child sexual abuse are also more likely to participate in relationships later in life where they are revictimized emotionally, physically, or sexually. It is common for victims of sexual abuse to encounter some type of sexual dysfunction later in life, even if engaged in a loving relationship.

INTERVENTIONS FOR THE VICTIM/SURVIVOR

Children

A child-centered approach, where the decisions and actions are examined in the child's best interest, is employed by understanding how the abuse affected the child while acknowledging that abuse affects each person differently. In addition to acting in a manner that is congruent with the child's wishes, a child-centered approach also attempts to ensure that the child's best interests have been met.

Individual, group, and family therapy models are used in treatment. When a sexually abused child has posttraumatic stress reactions, abuse-specific cognitive behavior therapy (CBT) has been shown to be helpful, especially with school-aged children. Components of this therapy include psychoeducation (providing information about abuse and offenders, and explaining the principles of CBT), anxiety management (teaching relaxation and coping strategies to reduce fear and anxiety), exposure (talking, drawing, or writing about the abuse to reduce avoidance and to reduce automatic responses that do not promote adjustment), and cognitive therapy (challenging and replacing irrational or unhelpful thoughts about the event or one's self). Parents of the child may also participate in therapy to reduce their distress, learn effective strategies for behavior management, and increase their support of the child. Creating a sense of safety for each family member may also be a focus.

Group therapy has been helpful in reducing the feeling of isolation or "differentness" for some survivors, and may provide normalization and validation of one's experience and reactions. Peers may offer an alternate support system to survivors who lack family support, and may find value and meaning in being of help to others. However, there have been few studies of the efficacy of group therapy with adolescents.

While pharmacological treatment is not recommended as a primary treatment for sexually traumatized children, medications are sometimes used to supplement psychosocial interventions. There have been no placebo-controlled studies of medication with abused children, but there have been some studies suggesting

that antidepressants and alpha-adrenergic or beta-blocker drugs may be useful. Since sexual abuse effects may co-occur with other mental health concerns, the other conditions may require treatment as well.

Adults Who Were Abused as Children

When adults who were sexually abused as children enter therapy, often one of the treatment goals may be to improve coping mechanisms that were adopted earlier in their lives. Many times these persons attempt to cope with their abuse through acting out behaviors such as violence, internalizing behaviors such as eating disorders, substance abuse, and the perpetuation of abuse in other relationships. A wide variety of treatments are available for persons who were sexually abused as children, especially through psychotherapy. For many survivors of abuse who engage in individual or group psychotherapy, treatment goals often include an increase of awareness of the abuse and determination to change the thoughts into a more positive experience (labeling oneself as a "survivor" instead of a "victim"), an educational component, an introduction to more positive ways to cope, emphasis on the strengths of the person, and normalization of their responses to the abuse.

The entire therapeutic process is often found to be helpful in better understanding and decreasing the frequency of flashbacks. This is attempted by having the survivor work toward fully confronting the circumstances of the abuse and to reintegrate the triggers into their conscious mind, which in turn would help them to distinguish the past from the present and minimize flashbacks. Other goals of therapy can include, but are not limited to, processing feelings of anger, establishment of age-appropriate sexual knowledge and communication skills, and creating a safe and supportive home environment.

TREATMENT OF PERPETRATORS

Treatment of Children With Sexual Behavior Problems

Girls and boys less than 6 years of age, and even younger, have demonstrated sexually aggressive behaviors against other children. The label of "children with sexual behavior problems" is recommended for such children (instead of "child offenders" or "child perpetrators") because it labels the behavior rather than the child's identity. Since young children do not have cognitive skills comparable with those of adolescents or adults to plan, groom a victim, or rationalize, their aggressive behaviors are more often impulsive. These children are likely to have been exposed to explicit sexual activity (i.e., through experiencing sexual abuse, access to sexually explicit media, poor parental supervision). Helping parents learn effective behavior management techniques is an important part of treatment, as are increasing parental supervision, providing age-appropriate sexuality education, and teaching rules about sexual behavior.

Treatment of Adolescent Perpetrators/Juvenile Sex Offenders

According to the National Incident-Based Reporting System of the FBI, 43% of sexual assaults against children 6 years of age or younger are committed by juvenile offenders. Since the early 1980s, research and treatment for juvenile sex offenders has increased, although very few large-scale studies have been done. About 90% of known adolescent sexual offenders are male. No single personality profile has been identified for adolescent offenders, but many have been observed to have poor social skills, additional behavior problems, learning disabilities, impulsivity, and depression. Their family backgrounds are diverse, with some families having parental alcoholism or other substance abuse, chaotic family patterns, or problems with cohesion or adaptability, while other families are characterized as healthy.

For adult offenders, treatment often focuses on modifying deviant arousal patterns, but this is less useful for adolescent offenders. Cognitive-behavioral and social skills training techniques are often used to build empathy for victims, reduce thinking errors or cognitive distortions (rationalizations that "justify" abuse), improve social skills, and teach techniques for anger management and self-control. Known reoffenses among juvenile sex offenders are low (ranging from 5% to 15% according to treatment studies) in the 5 to 10 years in which follow-up has been done. However, nonsexual reoffending among the youth is frequent.

A promising treatment approach that has been used to address not only the commission of sexual abuse but other delinquent behaviors as well is multisystemic therapy (MST). MST is an intensive home and community-based therapeutic approach that intervenes

in the social ecology of a youth and family. Such concerns as parental supervision, school attendance and achievement, and peer networks are addressed. Use of MST has been effective in reducing nonsexual recidivism for treated youth.

Treatment of Adult Perpetrators

On the other hand, recidivism rates for treated adult offenders is higher; a review of 43 treatment studies showed recidivism rates of about 12% for the treated groups and about 17% for comparison groups. Programs that were more likely to reduce recidivism were intensive (lasting at least several months), employed a behavioral or cognitive behavioral approach (in contrast to traditional psychodynamic or nondirective approaches), taught prosocial skills, were firmly but fairly administered, and involved the offender's real-world social network to keep the offender in contact with prosocial people and activities. Cognitive-behavioral techniques include the identification of patterns that lead to offending and learning skills to interrupt those patterns. The skills could include reducing alcohol use; learning problem-solving skills, effective coping, and self-control strategies; and participating in satisfying daily activities. For those with deviant fantasies, cognitive interventions include covert sensitization (imagining negative consequences to sexually offending), masturbatory satiation (masturbating to deviant thoughts until the masturbation becomes boring or uncomfortable), and orgasmic reconditioning (thinking of socially acceptable sexual images just prior to orgasm). Relapse prevention may also be used with other treatment models. It involves identifying triggers to offend and developing a plan to reduce the likelihood. For offenders with brain injury or neurological disease, close supervision and monitoring may also be needed. Treatment is often conducted in a group setting. One of the largest treatment programs operates in Great Britain, but little has been published to date regarding its effectiveness.

Occasionally surgical and pharmacological interventions (use of hormonal medication to reduce arousal) are used with subgroups of adult sexual offenders. Although some people think castration (removal of the testes to reduce testosterone) would be a remedy, in about half of patients it does not prevent erection. For some offenders, "chemical castration" or administration of antiandrogen drugs has reduced the person's sex drive and sexual fantasy. However, side effects and resulting noncompliance with the medication have been problems with this approach. The most recent type of drug used is antidepressants (e.g., sertraline, clomipramine, and fluoxetine). These can be helpful in reducing deviant sex drive and also helping with depressed mood. Drug therapy is typically used in conjunction with cognitive-behavioral interventions, as part of a comprehensive treatment plan.

PREVENTION OF CHILD SEXUAL ABUSE

Decline in Reported Cases of Child Sexual Abuse

During the first decade that reported child abuse case data were reliably collected in the United States (1986–1996), the frequency of child sexual abuse doubled. However, in the past decade, a 40% decrease in substantiated cases has been observed (from 1992 to 2000, substantiated cases decreased from to 140,800 to 89,355). Analysis of these data suggests that a real decline has occurred, and this is not just an artifact of changes in substantiation or data-collection practices. Hypotheses regarding this decline include the impact of aggressive prosecution and incarceration of sex offenders. Between 1991 and 1997 the incarceration in state correctional facilities for sex crimes against children increased nearly 40%. It is also possible that public educational activities of the past two decades, and fears of detection and prosecution, have deterred the potential offenders most able to control their actions, therefore resulting in a decline in the most readily preventable cases. However, there is evidence from one state suggesting the decline may be partly due to a backlash against those reporting sexual abuse.

Prevention Strategies

Despite this decline, sexual abuse remains a significant public health problem. Various prevention approaches have been attempted. David Finkelhor, director of the Crimes Against Children Research Center, identified four preconditions to child sexual abuse:

1. Motivation for sexual abuse (being sexually aroused by children or fantasies involving children)
2. Overcoming internal inhibitors (using alcohol or drugs, acting impulsively)

3. Overcoming external inhibitors (having unsupervised access to children)
4. Overcoming the child's resistance (coercing or manipulating the child into participating)

Treatment of identified sex offenders usually focuses on attempts to reduce the first two factors, reducing deviant arousal and building inhibitions against offending. Law enforcement interventions have typically focused on creating external inhibitors (incarceration, sex offender registration and public notification, and postincarceration civil commitment). All states in the United States now have sex offender registries. There is no evidence to date as to whether registration and notification prevent sexual abuse, but they may result in quicker apprehension of repeat offenders.

Victimization prevention programs often focus on education of children to resist abuse and to disclose victimization. Studies of interventions to promote child resistance reveal that children often have difficulty learning and retaining the concepts in the educational programs (e.g., that an abuser may be someone they know), but the educational programs may increase earlier detection of abuse by encouraging children to report it.

A novel prevention approach has been advanced by Stop It Now!, a nonprofit group that promotes the use of four tools to address the root causes of child sexual abuse. Stop It Now! attempts to develop awareness in potential abusers and urge them to seek help; challenge those who abuse to stop immediately and seek treatment (a helpline and an Internet resource are provided); educate "bystanders" on how to confront abusers; and educate the public and the media to change the social climate to say, "We will no longer tolerate the sexual abuse of our children."

—Susan McCammon and Sarah Ramby

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SEXUAL ACTIVITY

Adolescence is characterized as a period of rapid growth involving dramatic change. This stage of development begins with puberty and involves many physical, cognitive, and emotional changes that mark the shift from childhood to adulthood. Girls reach puberty approximately 12 to 18 months earlier than boys do, with the average age range for beginning puberty being 9.5 to 13.5 years for boys and 8 to 13 years for girls. In addition, these changes lead to an increased interest in sex, including masturbation and sexual experimentation. Adolescent sexual behavior, unfortunately, is also associated with certain risks such as sexually transmissible infections and unplanned pregnancy. The best protection against these problems is knowledge—and making healthy decisions about

sex depends on accurate information as well the motivation to make responsible choices.

With the onset of puberty, adolescents begin to experience changes in many realms of life. For one, during this period teenagers demonstrate an increasing ability to use rational and abstract thought. They start to question authority, rules, laws, and customs, and begin to develop their own theories and viewpoints. Not surprisingly, parents often describe their adolescent children as stubborn and rebellious. Furthermore, adolescence is a time when young males and females attempt to establish a sense of who they are, where they fit into their peer group, and what their goals will be. Many adolescents struggle with the answers to the question "Who am I?" This beginning of identity formation, which can persist into adulthood, leads to many questions, including curiosity about dating, sex, and love.

Physically, adolescence brings on dramatic changes involving the body. Development often begins with a growth spurt characterized by significant bone and muscle growth, weight gain, and the maturation of the brain, heart, lungs, and reproductive system. Changes in the reproductive system are the hallmark of adolescent development, known as puberty. For males, puberty brings about a growth in the size of the penis and testes; the production of semen; the appearance of pubic, underarm, and facial hair; and also a deepening of the voice. Many males also experience nocturnal emissions, or wet dreams, when sperm production first begins. For females, puberty is a time during which menarche (the first menstrual period) begins, the vagina elongates, the ovaries and uterus grow, breasts begin to develop, and pubic and underarm hair appear as well. All of these developments begin when a part of the brain, the hypothalamus, signals the release of hormones known as gonadotropins. These hormones then direct the production of testosterone by the testes and estrogen by the ovaries, which in turn direct the body to begin pubertal changes.

These psychological and physical changes signal a growing interest in sexual behavior. Masturbation is the most common form of sexual behavior: 88% of boys and 62% of girls have masturbated by age 16. Frequency of masturbation increases throughout adolescence; among teenagers 16 to 19 years old, more than two thirds of boys and half of girls masturbate weekly. However, many adolescents (females in particular) also feel guilt and shame about masturbating.

Sexual interactions also often begin in adolescence, with most boys and girls progressing through a similar sequence of behaviors. The characteristic progression begins with hugging and kissing ("making out"), followed by fondling ("petting"), rubbing genitals together while clothed, and ultimately sexual intercourse. Some teenagers experiment with oral sex as an alternative to sexual intercourse and to preserve virginity. The age at first intercourse varies, but 46% of high school students report having sex at least once, and one third are currently sexually active. The proportion of sexually active students grows from one-third in the 9th grade to nearly two-thirds by the 12th grade. African American teenagers are more likely to be sexually experienced than their white and Hispanic peers (Table 1). Overall, boys are more sexually active and start earlier than girls. In general, the gender and racial/ethnic differences in sexual behavior dissipate by early adulthood.

Table 1 Percentage of Sexually Active High School Students

	Ever Had Sexual Intercourse		
Category	***Female***	***Male***	***Total***
Race/Ethnicity			
White	43%	41%	42%
Black	61%	74%	67%
Hispanic	46%	57%	52%
Grade			
9th	28%	37%	33%
10th	43%	45%	44%
11th	53%	53%	53%
12th	62%	61%	62%
Total	**45%**	**48%**	**47%**

SOURCE: U.S. Risk Behavior Survey, 2003.

Some factors contributing to early intercourse include: early maturation, increased testosterone levels (for males and females), peer norms, peer pressure, academic achievement, athletic involvement, religion, availability of opportunities, and parental influence. Adolescents who perceive that their peers are having sex are more inclined to do so themselves, and direct pressure from peers can increase the likelihood that the adolescent will engage in sexual activity. However, parental communication about sex can offset peer influence—teenagers who report high levels of communication and close

relationships with their parents are more likely to delay having sex. For girls, athletic involvement also seems to decrease the likelihood of early intercourse. For both sexes, academic achievement is related to the onset of sexual intercourse. It has been shown that adolescents with low academic achievement and low educational goals are more likely to become sexually active earlier than those with high achievement and goals. Furthermore, adolescents who consider religion an important aspect of their lives are less likely to be sexually active. Finally, opportunity plays a role in early sexual initiation. Research shows that being in a steady relationship predicts early initiation, whereas limited dating is associated with later sexual initiation in girls. Reactions of boys and girls to first intercourse can differ, but both genders report feelings of anxiety and fear about the first time. However, males also report more pleasure and less guilt than females, due in part to the fact that males are significantly more likely to reach orgasm during first intercourse. Both genders report more pleasure and less guilt if they are in a committed rather than a casual relationship, the so-called "love effect."

Unprepared sexual activity leads to some risks—including sexually transmitted infections (STIs) and teenage pregnancy. More than 3 million teenagers in the United States contract one or more STIs each year, and one in four sexually active adolescents will contract an STI. Although rates of gonorrhea in adolescents have dropped over the past 10 years, the rates of chlamydia have risen. However, this may be due in part to improved screening techniques. It is estimated that 26% to 46% of young women are infected with the human papillomavirus (HPV or genital warts), and 15% to 20% of young men and women are infected with genital herpes, another sexually transmitted virus. Adolescent girls are most susceptible to contracting STIs, and if left untreated are at greater risk for developing long-term health problems, which can include infertility. In addition, the rates of infection by the human immunodeficiency virus (HIV) are increasing among adolescents—acquired immunodeficiency syndrome (AIDS) is the seventh-leading cause of death among 15- to 24-year-olds in the United States. One of the main reasons for this increase is that many teenagers do not practice safer sex. Studies show one-third or more of sexually active high school students had not used a condom during their last sexual encounter. Short of abstinence, condoms are the most effective means of protection against STIs, HIV, and another problem of teenage sexuality—unplanned pregnancy.

Each year in the United States there are 870,000 pregnancies in females 15 to 19 years of age, and 80% of these are unintended. Thus, each year more than 7% of adolescents experience an unplanned pregnancy. On a positive note, these figures are at the lowest level in over a decade—adolescent pregnancy rates have dropped 27% since 1990. This decline is attributed to later onset of sexual activity and a greater use of contraception among teenagers. Even so, there are many problems associated with teenage pregnancy. Unintended pregnancies often place the adolescent mother and her child at a disadvantage economically, socially, and financially. Teenage mothers are significantly less likely to complete high school or attend college, more likely to have failed marriages, and are at a greater health risk than other adolescent females. One third of pregnant adolescents do not receive proper prenatal care, and the babies of teenage mothers commonly have low birth weight and other health complications.

In order to allay these complications, interventions have been developed to help educate adolescents about sexuality. School-based programs, such as sexuality education classes, are often used to accomplish this goal and they often do lead to greater and more effective contraceptive use among teenagers. Yet, although the majority of people in the United States favor sexuality education, there is also much controversy around what to teach and how to present this information. Despite fears that sexuality education may actually encourage adolescents to engage in sexual activity, studies dispel this myth.

The majority of programs have one of two goals: comprehensive sexuality education or an exclusive focus on abstinence from sexual activity. Both share the common goal of encouraging adolescents to postpone intercourse until they are prepared for responsible sexual decision making. A successful program would ideally include teaching specific skills for reducing sexual risk behaviors (such as how to obtain and use condoms), techniques for communicating with parents and partners about sex, methods of dealing with peer pressure, and basic information of sexual anatomy and reproduction. Sexuality education programs are even more effective when paired with availability of contraceptives, reproductive and peer counseling, and sexual health services like STI screening. In addition, parents should play a large

part in helping adolescents to make healthy decisions—teenagers who are able to discuss their sexuality and related concerns openly with parents have fewer sex partners and are less likely to engage in risky sexual behaviors.

—Jennifer Buckley and Richard D. McAnulty

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SEXUALLY TRANSMITTED DISEASES (STDs)

Sexually transmitted diseases or infections (STDs or STIs) are primarily spread through vaginal, anal, or oral intercourse. Pathogenic organisms, such as bacteria or viruses, are carried by body fluids, such as semen and blood, through vaginal, urethral, cervical, rectal, and oral mucous membranes. A few are transmitted via contact with affected skin or contaminated objects.

It is estimated that hundreds of millions of new STD cases appear worldwide every year. More males are infected with STDs than females, but compared with males, females with STDs tend to be younger. On the whole, 15- to 24-year-olds tend to be at greatest risk. They are most likely to not use condoms, have more than one sexual partner, and have high-risk partners. However, anyone who has sex can contract an STD; the only certain way to avoid an STD is to abstain from sex. Barring abstinence, male and female condoms are about 90% effective in protecting against STDs. Minimizing the number of sexual partners can also reduce the risk for acquiring STDs.

The diagnosis and treatment of STDs requires a physician's special knowledge, skills, and procedures. Using antibiotics, doctors can cure bacterial infections. Parasitic and fungal diseases can be cured with a variety of nonprescription and prescription drugs. There are no drugs, however, that can rid the body of a viral STD, but the symptoms can be eased and controlled with various treatments, including antiviral, antibiotic, and immune system–boosting drugs. Worldwide, STDs cost billions of dollars to treat every year. Although STDs are rarely fatal, some can foster human immunodeficiency virus (HIV) transmission, and if untreated lead to severe discomfort and complications. Additionally, without treatment, infected pregnant women can pass the STD to the fetus in the uterus or to the infant during birth.

STDs can also be emotionally devastating. They strain relationships with family, friends, and significant others, leaving individuals with STDs feeling isolated and rejected. For some, fear of rejection fosters concealment of the disease, but for others, revealing their disease protects them from disappointment with preintimate relationships. Due to increased anxiety and guilt that comes with the fear of transmission, STDs negatively affect sexual relationships, decreasing an individual's ability to have orgasms and to experience the warmth and intimacy associated with sex. Individuals with STDs also experience a drop in self-esteem because they often feel dirty, contaminated, and less sexually attractive. Feelings of depression, self-destructiveness, pessimism, and hostility frequently follow an STD diagnosis. Individuals diagnosed with an STD may exhibit short-term delusional thinking, disorganized speech or behavior, or medical symptoms unrelated to the STD but indicative of trauma-induced stress. Additionally, studies demonstrate that emotional distress and self-revulsion can foster symptom recurrence with some STDs. Counseling and support groups can help STD-diagnosed individuals cope with the stress and stigma of the disease.

BACTERIAL INFECTIONS

Bacteria are single-cell microorganisms existing with or on another organism. Gonorrhea, often called "the clap" or "the drip," is caused by the bacterium *Neisseria gonorrhoeae.* About 2 to 5 days after transmission, males experience burning urination and a yellowish, thick discharge from the penis. If untreated, male gonorrhea can cause fertility and kidney problems. Initially, women may only notice a slight vaginal discharge, but if untreated the bacteria may cause burning urination and irregular menstrual bleeding. It can also result in pelvic inflammatory disease (a major cause of female infertility), ectopic pregnancy, and chronic pelvic pain. During birth, infants can contract gonorrhea of the eyes.

Syphilis is caused by *Treponema pallidum* bacteria. Not only is it spread sexually, but touching the accompanying infectious chancre can also transmit syphilis. In the first stage (2–4 weeks from contamination), a round chancre or sore appears at the infection site; a few weeks later it disappears. Two to four weeks later a skin rash, characterized by raised red bumps that darken and burst, develops. At this stage the infected individual may also have headaches, fever, mouth sores, sore throat, and joint pain. When these symptoms disappear, the disease enters a dormant phase for many years. Within the last stage, a large destructive ulcer can appear anywhere in the body. If untreated, syphilis can attack the central nervous system or cardiovascular system and cause brain damage, paralysis, mental illness, and death. Syphilis can be passed through the placenta, affecting fetal development or causing miscarriage or stillbirth. Infants born with syphilis are at risk for vision, hearing, dental, and bone impairments.

Chlamydia trachomatis bacteria can cause an infection in the male urethra or epididymis and the female urethra, cervix, or endometrium. Most women and men do not experience symptoms, but women may notice frequent painful urination, a vaginal discharge, or lower abdominal pain, and men may experience symptoms similar to but milder than gonorrhea. Chlamydia is also like gonorrhea in that it can cause pelvic inflammatory disease. If chlamydia is transmitted through oral-genital contact, a sore throat is the first symptom. It can also be transmitted to the eye after touching infected genitals and to newborns passing through the birth canal of an infected mother, resulting in eye inflammation and pneumonia.

VIRAL INFECTIONS

Smaller than bacteria, viruses grow and reproduce within living cells. Viral infections include herpes simplex virus type 2 (HSV-2), hepatitis (types A, B, C, and D), human papillomavirus (HPV), and HIV. Although HIV is a sexually transmitted disease, its characteristics and effects are explained in a separate entry of this encyclopedia.

HSV-2, or genital herpes, is most contagious during active outbreaks, and transmission almost always occurs sexually. The primary symptom, itchy red bumps, usually appears on the genitals, thighs, or buttocks 3 to 7 days after exposure. The bumps develop blisters that break and turn into painful ulcers lasting 1 to 2 weeks. They can develop in the vagina or on the cervix accompanied by a vaginal discharge. Fever, burning urination, and aches and pains may also develop. HSV-2 can be spread to the eye after touching the broken blisters. Women with HSV-2 are at greater risk for cervical cancer. HSV-2 can be passed from mother to child during a vaginal birth and cause infant problems and death.

Hepatitis A, B, C, and D can be transmitted via sexual contact or a transfusion with contaminated blood. The virus causes an inflammation of the liver and symptoms that range in severity, including fever, fatigue, abdominal pain, nausea, vomiting, dark urine, light-colored stools, and yellow skin and eyes. Symptoms can be so mild that they go unnoticed and untreated, leading to cirrhosis, cancer of the liver, or death.

Some types of HPV cause genital warts. They are cauliflower-like growths that appear on any part of a woman's vulva, such as the labia, or on the cervix or walls of the vagina. In men they can appear on the penis, foreskin, scrotum, or urethra. Occasionally, they may cause some pain or itching around genital openings. HPV may cause cell changes and therefore has been associated with cervical cancer. The virus is most often transmitted by sexual contact but can be transmitted via contaminated fabrics or objects. In rare cases HPV has been transmitted to infants during birth.

PARASITIC INFECTIONS

There are three parasitic infections or infestations that can be sexually transmitted: trichomoniasis, pediculosis, and scabies. Trichomoniasis, or "trich,"

is caused by a one-celled animal or protozoan, *Trichomonas vaginalis*. Although some women are asymptomatic, typical symptoms include an itchy burning vulva and a foamy, yellowish and foul-smelling discharge. Men can also be asymptomatic, but they may experience an inflammation of the urethra.

Pediculosis, or "crabs," are pubic lice, *Phthirus publis*. Not only are they transmitted via sexual contact, but also by contact with infested fabrics or objects. Crabs are difficult to see and cause intense itching in hairy pubic areas where the lice burrow into the skin. Scabies, or *Sarcoptes scabiei*, are similar to crabs in that they cause intense itching, but there are visual symptoms such as red lines, welts, and blisters where the mites burrow into the skin. They can also be transmitted via infested fabrics contacting the skin.

CONCLUSION

Approximately 50 STDs have been identified worldwide—only the most common and problematic were reviewed here. Some of those excluded are candidiasis, bacterial vaginosis, HSV-1, chancroid, shigellosis, granuloma inguinale, and lymphogranuloma venereum. The number and variety of STDs may contribute to the difficulty in recognizing specific STD symptoms, making diagnosis more improbable. Considering that some STDs may go undiagnosed and that some are incurable, they are likely to have significant life-long effects throughout our population.

—Danae E. Roberts

See also Acquired Immune Deficiency Syndrome (AIDS), Human Immunodeficiency Virus (HIV)

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SHORT-TERM MEMORY

The concept of a short-term store has been in existence for many years and is one of the most-researched topics in cognitive science. The importance of short-term memory cannot be overestimated: Nearly every act of cognition—reasoning, planning, problem solving—relies on our ability to store and manipulate information. For instance, imagine you are in the grocery store and need to know whether or not you have enough money for your purchases. If you do not want to take the time to write down all of the prices and add them on paper, you must be able to mentally store all of the prices while you add them together in your head. Although you remember the individual prices long enough to complete the task, you then soon forget them. This type of memory can be distinguished for longer-lasting memories for facts or events.

The study of short-term memory was revolutionized by the experiments of Alan D. Baddeley and colleagues in the 1970s and 1980s. According to their model, short-term or working memory consists of at least two storage buffers: one for visuospatial information and another for verbal information. A unique

aspect of their model was its inclusion of a central executive that coordinates the activities of the storage buffers and manipulates information. This newer concept of working memory can be likened to a mental workspace rather than a simple storage device or a conduit into long-term memory. The switch in terminology between short-term memory and working memory reflects this belief in the importance of using this mechanism for performing our mental work.

Much recent short-term memory research has focused on three issues: (1) Are there truly separable stores for different types of information? (2) What is the nature of the central executive? (3) Do individual differences in short-term memory abilities account for different levels of ability to read, plan, and solve problems?

STORAGE

Research suggests at least two distinct storage buffers: one for the verbal information and another for visuospatial information. Much of the evidence for this distinction comes from the logic of double dissociation. According to this logic, two cognitive mechanisms (e.g., verbal and spatial short-term memory) are separate if the task performance is differentially impacted by two different variables. For example, performance on verbal working memory tasks (e.g., remember a set of letters), but not spatial working memory tasks (e.g., remembering a set of locations on a computer screen), is impaired by having to say a syllable or word repeatedly (e.g., "the, the, the") during a memory delay. This is presumably because having to repeat the word or syllable prevents people from silently rehearsing the to-be-remembered letters, a common tactic known as subvocal rehearsal. Conversely, being required to tap a set of computer keys in a spatial pattern interferes with memory for a set of locations in space, but not with memory for a set of letters. Taken together, this set of findings implies that verbal and spatial short-term memory rely on different pools of cognitive resources.

Patricia A. Reuter-Lorenz and Andrea C. Miller used the logic of double dissociation to determine whether verbal and spatial short-term memory rely on different neural mechanisms, by testing patient V. P. on verbal and spatial short-term memory tasks. V. P. had undergone a collosotomy (split-brain) procedure, in which the corpus collosum, the major connecting tract between the two hemispheres, was severed as a treatment for severe epilepsy. Strikingly, Reuter-Lorenz and Miller found that when the verbal variant of the task was presented to the left hemisphere, performance was markedly superior to when the verbal task was presented to the right hemisphere. The opposite was true when the spatial task was presented to the right hemisphere.

These findings are bolstered by data from neuroimaging and patient studies of the division between verbal and spatial information. For instance, in a positron emission tomography experiment, Edward E. Smith, John Jonides, and Robert A. Koeppe asked participants to perform two variants of an item recognition task. What they found was that the verbal task was mediated largely by left hemisphere neural regions, whereas the spatial task was relatively largely right lateralized.

THE CENTRAL EXECUTIVE

In the original working memory model of Baddeley and Hitch, the central executive was the least developed component, and there has been a great deal of interest in trying to characterize this mechanism. Some have proposed that it coordinates and controls various subparts of the system. Such a conceptualization is consistent with a number of different computational models, such as EPIC by David E. Meyer and David E. Kieras, in that many major architectures contain a mechanism that determines whether goals and subgoals are being met and strategically schedules the initiation of various processes. Others have conceptualized executive function as a collection of processes that serve to manipulate the contents of working memory, including inhibition, attention, and temporal ordering.

INDIVIDUAL DIFFERENCES

One thing that appears to distinguish earlier ideas of short-term memory from working memory is that performance on tasks involving just the short-term storage of information does not predict how well people will perform on higher-order reasoning skills, whereas performance on tasks involving both the simultaneous storage and manipulation of information in memory predicts a host of cognitive skills. For instance, Daneman and Carpenter showed in 1980 that working memory capacity, as defined by the ability to simultaneously store and process information, predicts reading comprehension skill. Working memory capacity also predicts how well people will perform on problem-solving tasks,

such as conditional reasoning problems. Thus, it appears that working memory capacity can account for many of the skills that comprise intelligence.

DEVELOPMENT

From a developmental perspective, working memory is critical because it may play a role in learning language, and particularly in vocabulary acquisition. Furthermore, just as working memory capacity can predict performance on higher-order cognitive tasks, working memory ability has been hypothesized to play a role in diverse childhood and adult maladies such as attention deficit hyperactivity disorder, mathematical disabilities, and reading disabilities. Furthermore, children of school age in cultures in which the articulation time to numbers or letters is shorter (e.g., Chinese, as compared to German) show a greater memory capacity earlier in development. This is because verbal memory is language based and limited not just by the number of items, but also by how long it takes to utter them.

Just as important cognitive skills appear to develop with the help of working memory in childhood, working memory declines in older adults appear to be a factor in age-related changes in a range of cognitive tasks. Adults reach their peak working memory capacity in their twenties, conveniently coinciding with the college years for many, then declines steadily over the life span into old age.

SUMMARY AND CONCLUSIONS

As we have seen, short-term, or working, memory is a critical cognitive skill that impacts many acts of cognition. It can be conceptualized as the short-term maintenance and storage of task-relevant information and involves not just passively storing information, but also manipulating information in the service of thought. There are at least two types of working memory, one for verbal information and another for spatial information, as well as a set of processes that either coordinate the buffers or manipulate information—probably both. Working memory is an important concept for developmental psychology because working memory capacity determines reading comprehension and may play a role in language development, particularly in vocabulary acquisition.

—Christy Marshuetz

See also Memory Failure

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SHYNESS

Shyness is the term most often used to label feelings of anxiety and inhibition in social situations. Common synonyms include bashfulness, timidity, self-consciousness, reticence, and social anxiety. The experience of shyness typically involves three components. Global feelings of emotional arousal and specific

physiological complaints, such as upset stomach, pounding heart, sweating, or blushing define the somatic anxiety component of shyness. Acute public self-consciousness, self-critical thoughts, and worries about being evaluated negatively by others constitute the second, cognitive component of shyness. The third component includes observable behavior such as quietness, cautiousness, awkward body language, avoidance of eye contact, and social withdrawal.

Situations differ in their power to evoke these reactions of social anxiety. Ratings of shyness-eliciting situations reveal that interactions with strangers, encounters requiring assertive behavior, and explicitly evaluative settings such as interviews provoke the strongest feelings of social anxiety. From an evolutionary perspective on emotional development, a moderate amount of wariness regarding strangers and unfamiliar or unpredictable situations has considerable adaptive value. Social anxiety is functional when it motivates preparation and rehearsal for important interpersonal events, and shyness also helps to facilitate cooperative group living by inhibiting individual behavior that is socially unacceptable. Situational shyness as a transitory emotional state appears to be a normal aspect of human development and everyday adult life. For some people, however, shyness is more than a temporary situational response; it occurs with sufficient frequency and intensity to be considered a personality trait. Although some psychologists have argued that the positive connotations of shyness, such as modesty or sensitivity, should be emphasized, it is generally viewed as an undesirable personality characteristic.

In early childhood, shyness is usually manifested as the relative absence or inhibition of normally expected social behaviors. The child appears excessively quiet, with diminished social participation. For shy children, the normal peaks of stranger anxiety (9 months) and separation anxiety (18 months) do not fade away. Shyness is one of the few temperamental traits whose precursors in infancy are often clear. About 15% to 20% of infants typically respond to a new situation or stimulus (e.g., an unfamiliar toy, person, or place) by withdrawing and becoming either emotionally subdued or upset (crying, fussing, and fretting). It has been speculated that this pattern of inhibition to novelty is related to a lower threshold for arousal in sites in the amygdala. Research studies of identical and fraternal twins indicate that the temperamental predisposition for shyness has a substantial genetic component. Infants with this highly reactive temperament in the first year of life are more likely to be wary or fearful of strangers at the end of the second year, and they are also more likely to be described as shy by their kindergarten teachers than are children with an opposite, behaviorally uninhibited temperament.

Temperamental inhibition in infancy does not lead invariably to childhood shyness. Parents who are sensitive to the nature of their inhibited child's temperament, who take an active role in helping the child to develop relationships with playmates, and who facilitate involvement in school activities appear to ameliorate the impact of shyness on the child's subsequent social adjustment. Childhood shyness is a joint product of temperament and socialization experiences within and outside the family. Retrospective reports indicate that 75% of young adults who say they were shy in early childhood continue to identify themselves as shy persons. Equally significant, however, is the fact that about half of shy adults report that they did not become troubled by shyness until they were between the ages of 8 and 14. While about 33% of elementary school–aged children in the United States are shy, the developmental peak for shyness occurs during adolescence, when 60% of the girls and 50% of the boys in seventh and eighth grades identify themselves as shy.

Most of the children who first become shy in later childhood and early adolescence do not have the temperamental predisposition for shyness. Instead, late-developing shyness is usually caused by adjustment problems in adolescent social development. The bodily changes of puberty, the newly acquired cognitive ability to think abstractly about the self and the environment, and the new demands and opportunities resulting from changing social roles combine to make adolescents feel intensely self-conscious and socially awkward. Adolescent self-consciousness gradually declines after age 14, and less than 50% of individuals who first became shy during later childhood and early adolescence still consider themselves to be shy by age 21.

The inability of some adolescents to outgrow late-developing shyness has been linked to several factors. Research on the timing of puberty indicates that early-maturing girls and late-maturing boys suffer more severe social adjustment problems with their peers. Moving to a new neighborhood or school can disrupt the development of social skills, which are most easily practiced in safe and familiar surroundings. Shy adolescents need to experience positive social relationships in order to develop a healthy level

of self-esteem. If parents, siblings, teachers, or peers tease and embarrass the shy adolescent, he or she may develop the self-image of being an unworthy and unlikable person. Sex-role socialization puts different pressures on adolescent girls and boys. In the United States, teenage girls experience more symptoms of self-conscious shyness, such as doubts about their attractiveness and worries about what others think of them, whereas teenage boys tend to be more troubled by behavioral symptoms of shyness because the traditional male role requires initiative and assertiveness in social life.

Cultural differences in the prevalence of shyness may reflect the impact of socialization practices. In Israel children tend to be praised for being self-confident and often are included in adult conversations, two factors that may account for the low level of shyness reported by Israelis. In Japan, on the other hand, the incidence of shyness is much higher than in the United States. Japanese culture values harmony and tends to encourage dependency and quiet loyalty to one's superiors. Talkative or assertive individuals risk being considered immature or insincere, and there is a high level of concern about avoiding the shame of failure. All of these values may promote shyness yet also make it a somewhat less socially undesirable personality trait. In contrast, American cultural values that emphasize competition, individual achievement, and material success appear to create an environment in which it is particularly difficult for the shy person to feel secure and worthwhile.

Especially in cultures that value an outgoing, extraverted personality, shyness may be confused with introversion, introspectiveness, or a preference for solitude. Some people prefer to spend time alone rather than with others but also feel comfortable when they are in social settings. Such people are nonanxious introverts, who may be unsociable but are not shy. The opposite of shyness is social self-confidence, not extraversion. The problem for truly shy people is that their anxiety prevents them from participating in social life when they want to or need to. Longitudinal research indicates that when shyness continues into adulthood it can create significant barriers to satisfaction in love, work, recreation, and friendship. As a result, shy adults tend to be lonelier and less happy than those who are not shy. Childhood shyness does not, however, predict psychopathology in adulthood and usually should be considered part of the normal range of individual differences in personality and social behavior. Nevertheless, extremely shy children may have an increased risk for developing anxiety disorders such as social phobia, and those who appear particularly silent or withdrawn should be screened by a doctor for selective mutism and Asperger's syndrome.

In most cases, the goals of intervention in childhood shyness are essentially proactive and preventative in nature: helping the shy child to achieve better adjustment in his or her current and future social life. It is worth noting that retrospective interviews with painfully shy adults frequently contain complaints that doctors and teachers had ignored their childhood shyness. Advice from psychologists to parents typically emphasizes the need to avoid overprotecting or overindulging shy children. Rather than rushing to soothe away every sign of anxiety, parents should allow the shy child to experience moderate amounts of challenge, frustration, and stress. With emotional support from parents and gradual exposure to new objects, people, and places, the child will have opportunities to learn to cope with his or her own special sensitivity to novelty.

—Jonathan M. Cheek

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SIBLINGS

Sibling relationships are those relationships that a person has with a brother or sister. The relationship

that develops between siblings is one of the longest-lasting relationships individuals will have throughout their lives. A relationship with a sibling has been established long before one meets a partner or spouse and will last long after one's parents have died. Not only is this one of the longest-lasting relationships, but nearly 80% of children in the United States have at least one sibling. The quality of the relationship between siblings has significant developmental consequences for children and adults. When we speak of quality, we are talking about the type of relationship that exists between siblings with respect to the amount of conflict and rivalry, as well as the amount of affection or closeness in the relationship. Children with warm and friendly sibling relationships are often more caring and share with their brothers and sisters in the early years of childhood and as they reach adolescence can become very effective teachers for their younger siblings. Adult siblings with close ties to their brothers and sisters often use them as confidants and a source of social support. Elderly individuals often report that their relationships with their siblings are some of the last remaining sources of support in their later years.

Conflict and rivalry between siblings is often commonplace, and many parents are concerned about the extent to which their children have disagreements or fight with one another. Although living in a household with squabbling siblings may sometimes be annoying for parents, children and adolescents involved in sibling conflict are learning life-long skills about successful conflict resolution and the fact that others can have perspectives different from their own, skills that will serve them well as they start to establish friendships outside the home. Sibling rivalry and friendly competition between siblings can also foster academic achievement and motivate the children to set higher personal goals and to persevere in meeting those goals.

Even though conflict, warmth, and rivalry can have developmental benefits, this is so only when the conflict or rivalry occurs in the context of a warm and caring relationship between siblings. Sibling relationships characterized by intense rivalries and feelings of hatred toward one another or those involving high levels of aggression and destructive behavior can have devastating consequences for the children involved. Not only do children in such hostile and aggressive relationships risk physical harm at the hands of a more powerful bully, but there are also severe psychological consequences, including lower self-esteem, feelings of loneliness, and in some cases depression. Furthermore, the aggressive exchanges between siblings cannot only escalate conflict and hostile feelings toward one another, but children and adolescents in these destructive relationships often learn that aggression against others is an acceptable means of settling conflict and they can be seen using similar forms of aggression with their peers in school. More aggression and violence occurs between siblings in families than any other family relationship, and as a result, parents may believe that "kids are just being kids" or "all siblings fight" and they will eventually outgrow it. Rather than dismissing physical aggression between siblings as something that all kids do or a stage they are going through, parents would be well advised to intervene early to diminish such dangerous and damaging behavior between their children.

The type of relationship one develops with a sibling starts early in life, often within weeks after the birth of a baby brother or sister. How well children accept a new baby in the house can determine whether or not the siblings eventually develop a close and affectionate relationship as they approach preschool, middle childhood, and adolescence or whether hostility and aggression start to become commonplace as children grow older and enter adulthood. Intense rivalries between adult siblings often have their origins in the early years of childhood. If one's sibling relationship with a sibling in the preschool years was warm and friendly, there's a high likelihood that these children will also have warm and friendly sibling relationships in adolescence.

With the increasing rate of divorce in the United States, stepsiblings and half-siblings have now become commonplace. *Stepsiblings* refers to the typical *Brady Bunch* scenario where children from two different marriages, and therefore two different sets of biological parents, are brought together to live as one family. *Half-siblings* describe the situation where one child is from a previous marriage, but the other child is the product of the current parents' marriage. In other words, the two children share one biological parent, either mother or father, but the second parent is from the previous marriage. When divorced parents remarry, they often worry about how stepchildren will accept the new marriage and how well stepsiblings will get along with one another. Or they worry about how an older sibling will accept the new half-sibling once he or she is born. It is the case that more conflict and rivalry is reported between stepsiblings in remarried

families than in nondivorced families, but how parents manage the transition after the divorce and the subsequent remarriage plays a large role in how well children will adjust to their new living arrangement and their new brothers and sisters. Discussions with children and adolescents about what to expect and whether or nor they have fears or concerns about the new family situation should take place. Being realistic with children and talking beforehand about where disagreements might arise can prepare parents and children how to best deal with these potential areas of disagreement before they ever happen.

What parents do with each of their children plays a significant role in how well the siblings will get along with one another. It is the case that some children are more difficult than others and may be more prone to angry outbursts, but parental favoritism, where the parent prefers or loves one child more than the other, is one of the most significant factors in determining the intensity of sibling conflict and rivalry in the family. Children do differ with respect to their ages and their gender, and it is the case that parents may treat older and younger children differently or do different things with their daughters than their sons. Children are individuals, and parents often do things with children based on the child's individual characteristics, thus making it unlikely that parents are treating the children equally. There is a huge difference, though, between disciplining an older child more than a younger child because of age differences and openly expressing more love and affection toward one child to the exclusion of the other child. In the first case, a parent may legitimately expect more mature behavior from an older sibling who should also have a better understanding of right and wrong. In the second instance, the parent, for no apparent reason, shows favoritism toward one child and disfavors the other child. Making clear statements in front of the children that one is a disappointment, can never do anything right, or is clearly not as loveable as the other child not only breeds rivalry and hatred between siblings but also has devastating effects on the disfavored child's psychological well-being and adjustment. Older children and adolescents, however, do understand if a parent treats them differently from a sibling because of age or other personal characteristics and are often not offended by such differences. For instance, a younger sister will understand that her older brother may have the privilege of staying up later than she does without necessarily feeling resentment or hostility toward her parents or her older brother. She, too, will eventually have this privilege as she gets older. But, knowing that her brother always gets more expensive gifts, better opportunities for advancement, or more of dad's time and attention than she ever will may lead that child to wonder whether there may be some failing or deficit on her part that is responsible for such grievous injustice.

Sibling rivalry is a source of concern for many parents, and parents often want to know what they can do to diminish the rivalry and conflict between their children and how they can promote warm and caring sibling relationships. Although there is not much in the way of scientific research looking at sibling relationships, some recommendations as to how to prevent intense sibling rivalry can be made. Besides diminishing parental favoritism, parents must also be willing to discipline both children for misbehavior, but particularly any behaviors that lead to physical harm of one child, destruction of another's property, or verbally abusive and threatening behavior. Sibling conflict can escalate over time, and relations between siblings can deteriorate and become more hostile and aggressive during adolescence without proper intervention by parents to manage such behavior when the children are younger. Parents can also supervise their children's play early on, teaching children not only how to take turns and share, but also how to successfully solve the conflicts that will erupt. Discussing children's feelings at the time of a dispute allows children to see how others are affected by their transgressions, and this discussion can facilitate the development of perspective taking, a moral sense of right and wrong, and a respect and tolerance for others. Demonstrating affection to both children equally while also using age-appropriate discipline to discourage hostile and harmful behaviors between siblings can help ensure that this long-lasting relationship with a brother or sister provides years of emotional and instrumental support throughout their lifetimes.

—Brenda L. Volling

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SINGLE-PARENT FAMILY

The U.S. Census Bureau defines single-parent families as those in which the head of household is the only parent present in the home. The parent may be divorced, never married, widowed, or married with an absent spouse. In 2000, single-parent families constituted approximately 27% of all families in the United States. Women are most commonly the head of household in a single-parent family, with 9,969,000 single parent families headed by women, of 12,201,000 single parent families total, in 2002. The number of single-parent family households headed by women increased only slightly between 1998 and 2002, from 9.8 million to about 9.9 million. Single-parent families with men as the head of household increased from 2.1 million in 1998 to approximately 2.3 million in 2002. Overall, the prevalence rate of single-parent families rose from 11.9 million in 1998 to 12.2 million in 2002, as reported by the U.S. Census Bureau.

Because the majority of single-parent households are headed by women, a large amount of research has been conducted on this population. Consequently, relatively few studies have focused on the impact that single-parent families headed by men may have on children.

POVERTY RATES

Roughly 25% of all single-parent family households live below the poverty level. Of the 3.6 million single-parent families living below the poverty level, about 3.2 million of them are headed by women. African American single-parent families headed by women are disproportionately affected by poverty, thus limiting the medical, social, and psychological resources available to children in these families. Some research has found that, controlling for socioeconomic factors, no significant differences exist between single-parent families of color and two-parent families of color with respect to child social skills after accounting for these socioeconomic factors.

EMPLOYMENT EFFECTS

Research focusing on maternal employment in single-parent families has resulted in divergent findings. While numerous studies assert that maternal employment and length of workday, in particular, have adverse effects on children in single-parent families, other studies have found no adverse effects and often positive effects of maternal employment. Recent research focusing on maternal employment status has found it to play a role in children's intellectual functioning and behavior in single-parent families headed by women. Children of mothers who are employed have been found to obtain significantly higher scores on measures of cognitive abilities and achievement. Moreover, these children exhibit fewer externalizing problem behaviors than children of unemployed mothers. However, the beneficial impact of maternal employment may not be due to employment itself, but rather to the financial resources and higher maternal self-esteem associated with being employed. While there remains some controversy as to whether maternal employment actually has a positive impact on children in single-parent families, at the very least, it has not been found to consistently have a negative impact on children.

RISK FACTORS

Certain risk factors have been found to be associated with being raised in a single-parent family versus a two-parent family. Factors such as lower socioeconomic status, greater rates of residential mobility, and lower levels of parental supervision are all linked to a higher risk for delinquency during adolescence. Additionally, research indicates that children from single-parent families are more likely to engage in delinquent activities when they attend school where a

greater proportion of students are being raised in single-parent families.

An extensive amount of research has been conducted on parent-child interactions, especially in relation to the mother-child relationship. Due to the high number of maternal-headed single-parent families in the United States, it follows that this type of familial relationship warrants careful examination. Research indicates that, in general, adolescents experience the most severe conflicts with their mothers. Thus, in single-parent families, this discordant relationship may increase a child's risk for engaging in unhealthy behaviors.

PROTECTIVE FACTORS

Recent research has indicated that single-parent families contain many positive elements that had previously been overlooked due to the focus on negative factors associated with them. In fact, many children from single-parent families experience healthy developmental outcomes.

Some factors that serve to protect children growing up in single-parent families from developing delinquent behaviors include positive parental involvement and support; extended family involvement and support; involvement in structured, constructive activities; healthy parental relationships (when parents are divorced or apart); maternal optimism; and healthy psychological well-being of the parent. "Family cohesion" has also been identified by both single-parent families and two-parent families as a strength upon which their family foundations were built, thus recognizing the similarities in perceptions and positive features across these two family structures.

SUMMARY

Single-parent families constitute roughly a quarter of the U.S. family population. While there has been a historical stigma associated with one-parent families—for instance, being characterized by some as a key indication of our society's deterioration—recent research indicates that there are unique strengths associated with this family subtype. Additionally, findings indicate that most children who grow up in this type of family experience healthy, typical development. While research pertaining to delinquent behaviors indicates that children from single-parent families are at a greater risk for engaging in various types of antisocial behaviors, recent studies have also indicated a number of protective factors associated with positive development and outcomes. Thus, single-parent families are increasingly recognized in research and perceived by the public as a common variation in the array of family structures.

—Shane R. Jimerson and Sarah M. Woehr

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SINGLE PARENTS

The most dramatic change in the structure of the American family over the past 20 years is the increase

in single-parent households. While single parenthood due to death of a spouse has remained relatively stable, single parenthood as a choice, single parenthood as a result of teen pregnancy, and single parenthood as a result of divorce have increased dramatically. One in four children is born to a never-married mother. Another 40% of children under the age of 18 will experience parental divorce. More than 27% of all American children currently live in homes headed by single parents. If trends remain consistent from other census data, it will only be a matter of a few years when one third of all children will live with a single parent.

Single parent families are defined as those either headed by a mother or a father, a sole parent, responsible for taking care of herself or himself and a child or children. This includes those created as a result of divorce, abandonment, death, unwed pregnancy, and adoption. In 1970, the total number of single-parent families was slightly fewer than 3.5 million. In 2000, this had quadrupled to 12 million single-parent families. Female-headed single-parent families in 2000 were more than 10 million, while male-headed single-parent families in 2000 were more than 2 million.

There has been much controversy over whether these single-parent families are as healthy as two-parent families for raising children. Past research stated that children from these families were more likely to drop out of school, bear children out of wedlock, and have trouble keeping jobs as young adults. However, we now know, lack of income is the single most important factor in understanding the health of children raised in single-parent households. The latest research finds that, in general, single-parent families are happy, healthy, and well-functioning families, despite the hardships they experience, and that the children of these families learn positive resiliency skills that children of two-parent families do not learn until much later in life.

One of the problems related to understanding single-parent families is that we have stereotyped them into one generic class of people. Yet the single-parent family is dramatically different and faces different developmental challenges based on how that family is formed. Single-parent families fall into three basic structures: single parenthood as a result of death, single parenthood as a result of divorce, and single parenthood as a result of never being married. Whether the single parent is widowed or divorced or never married may be the most important indicator of the quality of life for children in these families. Widowed and divorced single parents have an economic advantage over children living with a never-married single parent. They tend to be older and to have a higher income than never-married single parents. They also tend to have a much stronger support system within their families of origin and within their communities.

Historically, most single-parent families were created by death or desertion of a spouse. The 1950s were the first time that the percentage of single-parent families created by divorce exceeded those created by death. The 1970s ushered in another new trend of unmarried women bearing and raising children by themselves. This trend hit its highest point in 1990, with approximately 20% of white births, 37% of Hispanic births, and 67% of black births to unmarried females. Each particular type of single-parent family provides its own creation of problems and solutions.

The first type, single parenthood as a result of death, involves not only the creation of a new family structure regarding power and boundaries but also coping with issues regarding mourning the loss of a loved one. Even when death is expected, it is always a shock. Single parents must deal not only with their loss of a partner, but must also be able to help their children communicate feelings concerning the loss of a parent. Often these parents have a difficult time attending to the needs of their children because of their own depression and lack of coping skills. It is recommended that these parents find a local community group such as Parents Without Partners to enable them to work through their mourning. Only then will they be able to assist their children through their mourning process. After a time of mourning, the family must move on to the readjustment stage. A big part of this is reassigning tasks and responsibilities, both functional and emotional, to the remaining members of the family and then redefining their identity as a single-parent family.

The second type of single-parent family is the one created as the result of divorce. In 2000, 50% of white, non-Hispanic, single-mother-headed households were the result of divorce. Among black women, 17% were due to a divorce. Divorce is one of the most complicated forms of single-parent families because of the multifaceted relationship that exists between the absent parent and the custodial parent. The loss suffered through a divorce, for both children and parents, is an issue of great significance, regardless of financial or emotional support. It typically takes up to

3 years to adjust to the new single-parent household, during which time there may be frequent moves, which brings additional complications of adjustment for the children. If the children have to change neighborhoods, change schools, and change friends, their lives can be totally disrupted. The fewer changes the new single parent can make during this initial time, the easier it will be for the children. The custodial parent may experience the stressors of rebuilding financial and social networks, with the most stressful time being the first year after the divorce. The parent must also cope with his or her own feelings of anger and resentment toward the parent who has left. Many parents will turn to their children for comfort during this time and will use the children as a sounding board to verbalize their resentment toward the absent parent. This can create a situation in which the children feel caught in the middle, being asked to relay messages between the two parents. This can be devastating for these children. It can affect their school functioning, create conflict with friends, and destroy normal developmental childhood task accomplishments. If the single parent is having difficulty adjusting to his or her divorce, it is recommended that he or she seek a marriage and family therapist for counseling. The American Association for Marriage and Family Therapy has a Web site that can locate therapists throughout the United States and Canada.

Never-married single parents is the third category of single-parent families. This category can be further divided into single parenthood by intent and those by accident such as teen pregnancy. Never-married single-parent families are the fastest growing segment of single parents, especially among black females. In 2000, never-married single mothers accounted for 30% of white, non-Hispanic single-female-headed households, while they accounted for 65% of black single-female-headed households. One reason that has been given for the high percentage of black never-married mothers is the lack of available black males as marriage partners. It is estimated that one in every three black males is involved with the justice system. An unfortunate aspect of this never-married type of single parent is that she usually shoulders the total responsibility financially and emotionally for raising the children. Single never-married mothers in reality are not as TV or the movies would portray them. There is a new organization called Mothers Outside of Marriage (MOMs) that provides education and information for never-married women. There is also a Web site, UnwedAmerica.com, that provides linkages between unmarried mothers to assist in providing a much needed support system.

Single families, whether by death, by divorce, or by intent, are different, based on whether the single parent is a mother or a father. Single fathers can typically provide greater economic resources for their children, while single mothers often provide greater interpersonal resources such as attention and emotional support. Female-headed single-parent families have historically been the norm, making up approximately 85% of all single-parent families. Therefore, most of the information we know about how these families function is related to mothers raising their children. Thirty-four percent of single mother–headed households live below the poverty level, while only 16% of father-headed households live in poverty. Poverty increases stress in the single-parent family due to the inability to attain simple everyday needs such as food, housing, and child care. Employment of these single mothers is correlated to better health and to more positive self-esteem for the mother. However, because women are paid less than their male counterparts and because the professions available to them are lower-paying professions, these families are still likely to be in poverty.

In comparison with married mothers, single mothers are more socially isolated, receive less emotional and parental support, and have more unstable social networks. Financial strain is one of the strongest predictors of depression in single mothers. Higher levels of depression are predictive of more punitive disciplining of children, less parental nurturance, and increased unhappiness in their parenting role. Violence and abuse are also associated with mother-headed single-parent families who live in poverty. Single mothers in poverty are caught up in a vicious cycle of hopelessness and despair, which is detrimental to both them and their children. Better wages, better access to health insurance, work environments that are flexible, mandatory child support payments such as wage withholdings, and public preschool or day care would assist in breaking this cycle of poverty for mother-headed single-parent families.

Father-headed single-parent families have increased dramatically over the past 10 years. One advantage that single fathers have is that they usually have access to more than twice the financial resources of women. This allows the father to utilize caretakers

to relieve him when he chooses to create less role strain and stress over his parenting role. Fathers as single parents express confidence in their role; however, because mothers have been viewed as the gatekeepers for their children, few fathers fight for custody of their children.

Single fathers typically fall into two groups: white, middle-class divorced men or low-income men and men of color who may not have ever married the mother. White middle-class men typically have a strong familial support system and have access to resources to assist them in their role as a single parent. They typically have gone to court to fight for the custody of their children. The only negative that these fathers report is that being the primary caregiver for his children will often force him to take a less dominant role in his movement up the career ladder.

Low-income men and men of color often become single parents by default and are stressed by taking on the full-time, single-parenting role. They report they became parents because of the mother's lack of interest in parenting, the child's removal from the mother's household because of abuse or neglect, or the child actively sought to live with the father. Overall, these fathers report feeling ill prepared to assume sole parental responsibility. These men are more likely than most demographic groups to experience incarceration, crime, unemployment, poor health, and homelessness. These men are likely to rely on relatives and fictive kin for social and economic support. These fathers report a lack of support from public aid and feel they are questioned as to their intentions of being a single parent. However, despite their reluctance to become single fathers, these fathers grow to enjoy the role. Most will then fight to continue their role if the mother comes to reclaim their child.

There are both challenges and strengths that result from single parenting. As stated previously, the single most stressful challenge experienced by single-parent families is poverty. Thirty-four percent of single-mother-headed households and 16% of single-father-headed households live below the poverty level. Higher rates of poverty among women can be attributed to higher earning power of men, lack of child support payments, lack of affordable child care, and poor public assistance programs. Living with a family member can help with some of these problems, such as providing child care and economic support.

One of the biggest internal challenges of the single-parent family lies with defining boundaries and roles. The democratic nature of the single-parent household can blur needed boundary distinctions between parent and child. Without these appropriate boundaries, chaotic and confusing interactions can occur, which is not to the benefit of the parent or the children. Another challenge that goes along with boundaries is role delineation. Although role flexibility is what often enables these families to survive, it can also create undue stress on particular family members. Sons, particularly for single moms, can be placed in the "man of the house" role, while daughters may be placed in the peer, confidante role. Both of these roles are asking the child to be the emotional support of the parent, which can be detrimental in the long run.

Although children of single parents have increased responsibility in household and family obligations, this can lead to the positive aspects of increased autonomy and self-esteem. According to some current research, children of one-parent households are no more likely to experience emotional and physical problems than children of two-parent households, if financial stressors are reduced.

One strength of single-parent families is that they tend to be more democratic. Because these families usually have an informal way of relating to each other, they tend to take everyone's view into account before making decisions. Another strength is that these children learn at an early age how to be creative because they live with fewer resources. They realize the value of time and money and are therefore more protective of these.

Recent assessment of single-parent homes finds that most provide the structure, values, and nurturance that their children need, despite the hardships they experience and the bad press they receive. Their homes are not "broken," their lives are not miserable, and both parent and children thrive while managing the additional roles required of them. Unfortunately, rather than focusing on these strengths, American society has often chosen to concentrate on the problems. We know that it takes a village to raise a child, and nowhere is this truer than in single-parent families. Communities must praise single parents for their strengths and assist them with their needs. This is our obligation to our children.

—Mary Ann Adams, Jeff Hinton, and Patricia Sims

See also Divorce, Single-Parent Family

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SKINNER, B. F. (1904–1990)

In establishing a natural science of behavior, developing a philosophy of that science, and advancing their implications for improving the human condition, Burrhus Frederic (B. F.) Skinner became the most eminent psychologist of the 20th century. He was born and raised in Susquehanna, Pennsylvania, as American Progressivism and modernism neared their height. He received an AB in English from Hamilton College in 1926 and a PhD in psychology from Harvard University in 1931. He afterward held positions at Harvard (1931–1936), the University of Minnesota (1936–1945), Indiana University (1945–1947), and Harvard again (1947–1974), retiring as Professor Emeritus in 1974, but continuing to work.

Skinner tried making his mark first as a writer, but writing failed him as a means for understanding human behavior. So, he turned to psychology. With mechanical skills and a belief that understanding was based in empirical research, not contemplation, he invented methods and apparatus (e.g., the "Skinner box") with which he discovered the basic principles of voluntary behavior, notably its selection by consequences (e.g., reinforcement). In synthesizing his methods and results with Pavlov's, he established a science of behavior (*The Behavior of Organisms*, 1938). In adopting and adapting the contributions of Bacon and Mach, he derived a philosophy of the science—radical behaviorism.

While making still further discoveries and advances (e.g., shaping, rule-governed behavior), Skinner extended his science to human behavior. He described an experimental approach to intentional communities (*Walden Two*, 1948); offered behavioral accounts of human action (*Science and Human Behavior*, 1953; *Verbal Behavior*, 1957); applied his science to education and aging (*The Technology of Teaching*, 1968; *Enjoy Old Age,* 1983); naturalized ethical, social, and political philosophy (*Beyond Freedom and Dignity*, 1971); and founded a system of psychology known as behavior analysis. Behavior was its subject matter, not just what it studied; biology was context for environmental contingencies; and mind was public and private behavior in everyday context (*About Behaviorism*, 1974).

The behavior analysis of human development was fully influenced by Skinner's work. Bijou applied the style of Skinner's science to the analysis of child behavior (e.g., discriminative responding); Gewirtz extended its content to social development (e.g., attachment); and Baer provided an age-irrelevant concept of development and behavioral cusps as alternatives to age- and stage-based theories. Skinner's contributions extend across the human life span, with their most significant impact today being in the development and validation of empirically based treatments for atypical development (e.g., autism).

—Edward K. Morris

See also Applied Behavior Analysis, Operant Conditioning

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SLEEP

Sleep: We all do it, we all need it. An individual who lives to be 75 will have slept an estimated 22 to 23 years of that time (more than 200,000 hours).

WHAT IS SLEEP?

Sleep is defined in the laboratory by the use of three standard psychophysical measures: electroencephalography (EEG), which records brain wave activity; electrooculography (EOG), which records eye movements; and electromyography (EMG), which measures chin muscle activity, giving an indication of muscle tonus. Information from these instruments indicates sleep and sleep stages. During periods of wakefulness, the EEG pattern shows two basic types of activity. Beta waves occur when the individual is mentally alert and active. This is characterized by low-amplitude, irregular, high-frequency waves (13+ Hz). Alpha waves occur when an individual is resting quietly and is particularly evident when the eyes are closed. Alpha waves are high amplitude, more regular, and lower frequency (8–12 Hz).

There are two types of sleep: non–rapid eye movement (NREM) and rapid eye movement (REM) sleep. Within NREM sleep there are four stages usually recognized in humans.

Stage 1 is the transitional phase between full wakefulness and sleep. EEG activity is theta waves (3–7 Hz). In normal sleepers, stage 1 lasts from 30 seconds to about 7 minutes. During this period, reactivity to outside stimuli is diminished. Mental processes change during stage 1 as thoughts begin to drift, thinking is no longer reality oriented, and short dreams often develop. This is usually accompanied by slow, rolling eye movements. Nevertheless, many people subjectively feel that they are awake during stage 1.

Stage 2 continues to show theta waves and is marked by the appearance of EEG sleep spindles (bursts of 12–14 Hz activity lasting 0.5 second to 2 seconds) and k complexes (well delineated, slow negative EEG deflections that are followed by a positive component). This is the first bona fide sleep stage, and any thoughts during this stage are short, mundane, and fragmented. Slow-rolling eye movements cease when stage 2 begins.

Stage 3 is a transition from lighter sleep to deeper sleep and is distinguished by delta waves (0.5 to 2 Hz), which are high amplitude and very slow, mixed in with theta waves. At least 20% to 50% of an epoch (30-second time frame) must be dominated by delta to be stage 3.

Stage 4 indicates delta waves are present in 50% of the epoch. This is the deepest sleep.

REM sleep EEG patterns resemble those of stage 1 sleep, except that sawtooth waves are often seen. Rapid eye movements and atonia are the physiological characteristic of this sleep stage. Atonia is similar to a paralysis so the sleeper cannot act out dreams. In about 80% of awakenings from REM sleep, people recall dreams, whereas 5% of NREM awakenings result in full-fledged dream reports. In 60% to 80% of NREM awakenings, the sleepers can recall some thought-like fragments.

After going to bed, a sleeper first passes through a stage of relaxed wakefulness, characterized by alpha waves. Later the sleeper passes through stage 1 and into stage 2. Gradually descending deeper into sleep, most young adults enter delta sleep (stages 3 and 4) within 30 to 45 minutes after sleep onset. Depending on the sleeper's age, delta sleep may last from a few minutes up to an hour, then the sleeper "backtracks" to stage 2. About 70 to 90 minutes after sleep onset, the first REM period of the night occurs. It usually lasts about 5 minutes and it is by far the least intense REM period of the night, both in terms of the physiological manifestations of REM sleep and the psychological intensity of dreams. Children frequently do not have this first REM period. Most people cycle through the stages four to six times in a night with approximately a 90-minute cycle (children have a 60-minute cycle). As the night progresses, we spend less and less time in delta sleep. Early in the night, sleep is dominated by delta sleep, whereas early in the morning we tend to alternate between REM and stage 2. As the night progresses, REM periods become more intense, both physiologically and psychologically. The average night for an adult is approximately 5% stage 1, 45% to 50% stage 2, 7% stage 3, 13% stage 4, and 25% to 30% REM.

Our sleep habits change throughout our lifetime. A newborn typically sleeps approximately 16.5 hours

per 24-hour period. This is typically polyphasic sleep in that the infant is accumulating the 16.5 hours over several sleep periods throughout the day. By 1 month the infant is averaging 15 hours per 24-hour period and 14 hours by 6 months. By the time children turn 2 they are averaging closer to 10 hours per 24 hours, and by the age of 10 the average is just over 9 hours. During this time period, children become monophasic sleepers, getting their sleep in one consolidated, culturally accepted time frame (nighttime). At 18, the average adult is sleeping approximately 7 to 8 hours and continues this pattern into his or her sixties. By the time an individual turns 70, sleep time averages closer to 6.5 hours, and we see a polyphasic sleep emerging again. One of the major changes seen in the stages of sleep across the life span is the amount of time spent in REM and delta sleep (stages 3 and 4). The average newborn will spend close to 50% of the sleep time in REM, which decreases to 25% to 30% in childhood to about 20% or less after puberty. The amount of delta sleep steadily decreases from childhood to old age.

SLEEP DISORDERS

It is not uncommon for things go wrong with our sleep. Next to the common cold, sleep disorders are the most common health complaint. Sleep disorders are typically divided into four categories: disorders of initiating and maintaining sleep (i.e., insomnia), disorders of excessive somnolence (i.e., narcolepsy), disorders of the sleep-wake schedule (i.e., jet lag), and dysfunctions associated with sleep, sleep stages, or partial arousals (parasomnias—i.e., sleepwalking).

It is common for everyone to experience insomnia at some point in their lives. Insomnia in general means that you feel tired but you have trouble going to sleep or you can go to sleep but cannot sleep through the night. There are many causes of insomnia, with the most likely culprit being stress. There are many over-the-counter sleep aides that typically make the individual feel more relaxed, which makes it easier to fall asleep.

Narcolepsy refers to the disorder in which the individual suddenly falls into several minutes of REM sleep from an active waking state. This is very dramatic because it is accompanied by the atonia found during the REM period. Therefore, the individual literally collapses and remains immobile until a short period after awakening.

Sleep apnea is more common. Individuals suffering from insomnia have difficulty breathing once they have fallen asleep. After falling asleep individuals stop breathing for a short period. The breathing stop triggers these individuals to awaken for a gasp of air, and then they go back to sleep. They usually do not remember the awakenings during the night, but they do report being very tired during the day due to a lack of good, consolidated sleep during the night.

Sleepwalking (somnambulism) and sleep talking (somniloquy) usually occur during stage 4 sleep and not during REM, as most people believe. The normal atonia of REM prevents these events from occurring at that time. These are also more common in children and are typically outgrown.

DREAMING

Dreaming is an intriguing area to all of us. Do all people dream? Do our dreams have meaning? Research suggests that all people dream; if awakened from sleep when the EEG pattern suggests a REM period, the individual will report a dream. Instead of a distinction between dreamers and nondreamers, the distinction seems to be between recallers and nonrecallers (those that remember and those that do not). As for the role of those dreams, there are many theories explaining why we dream, some of which also try to explain the content of our dreams. Many theories look at explaining dreaming as a way for the individual to examine what is happening in their daily lives; the content is affected by the stressors and life events we are trying to deal with each day. Some researchers speculate that dreaming is a by-product of random activity in the brain during the REM stage of sleep and the "storyline" is determined by events or thoughts an individual has had. Others speculate that dreaming is a way of "cleaning house" and ridding the mind of unnecessary clutter. Finally, some suggest it is a time of memory consolidation. Why do we have so many conflicting theories of why we dream? It is a very difficult question to answer and a very difficult phenomenon to study.

SUMMARY

Sleep is an essential aspect of our daily lives, yet still remains somewhat of a mystery.

—Jo Ellen Meerdink

See also Apnea

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SMELL

Olfaction, also known as the sense of smell, is important for enjoying food and life, detecting danger (smoke, natural gas leak, rotten food), and communicating social information.

The olfactory receptor genes constitute the largest gene family in vertebrates. Humans have a total of about 350 functional olfactory receptor genes, which are used to detect thousands of different odors. (By contrast, only three photoreceptor genes are involved in making color discriminations.) The study of olfaction is a burgeoning field, albeit still at its early stage. It was not until 1991 that the family of olfactory receptors was first discovered. For this work, Linda Buck and Richard Axel were awarded the Nobel Prize in Medicine in 2004.

The molecular mechanism of olfactory processing is a work in progress. We do know that olfactory receptors bind to odorant molecules and relay the information along the axons of the olfactory neurons to the glomeruli in the olfactory bulb. From there, the information is projected to the areas of the brain involved in processing odor association and discrimination, as well as emotion and memory. These areas include the anterior olfactory nucleus, the amygdalae, the olfactory tubercle, the piriform and periamygdaloid cortical areas, and the rostral entorhinal cortex.

Olfactory learning occurs prenatally. The anatomical and physiological structure of the olfactory system is fully developed in utero, by about 28 gestational weeks. In many altricial animals, olfaction-based mother-infant recognition is essential for the survival of the infant. Olfaction-based mother-infant recognition is also reported in humans. Human newborns as early as 3 days of age orient more toward the smell of their own amniotic fluid over that of an unfamiliar mother. Similarly, newborns orient more toward the breast and underarm smell of their own mother over that of an unfamiliar lactating woman. Olfactory learning continues after birth. A 30-minute exposure to a novel odor (e.g., cherry) minutes after birth can lead to increased orientation toward the exposed odor tested 3 days later.

Hedonic preferences for odors appear to be similar in neonates and adults. Newborns less than 1 day old display facial expressions similar to those of adults to pleasant and unpleasant odors. Similar conclusions apply to children between 1 and 5 years of age, although hedonic differences with regard to specific odors have also been reported.

Olfactory performance can be influenced by a combination of experiential, cognitive, and biological factors. Across odors, absolute olfactory sensitivity threshold is similar in children and young adults. Odor identification, however, is often found to be poorer in children than in adults, possibly due to differences in experience. As early as in one's thirties, olfactory performance can start to decline. The decline becomes pronounced as people reach their sixties and beyond. Olfactory deficit has been reported in almost every major affective disorder and neurodegenerative disease. Research suggests that olfactory deficit used in conjunction with other biological markers may serve as a useful predictor of Alzheimer's disease and other cognitive disabilities. Women in general are better at naming, identifying, and discriminating among smells than men, although their absolute olfactory threshold per se does not appear to differ. Interestingly, women of childbearing age improved significantly in their absolute threshold to certain odors after repeated testing; no such improvement was seen in men of the same age, in postmenopausal women and senior men, or in prepubertal girls and boys.

There is evidence that olfaction plays a role in genetic fitness and interpersonal attractions. Women can sniff out genetic compatibility, and prefer the smell of T-shirts worn by men who are genetically compatible to themselves. Both men and women reported olfactory information as important in mate choice. Chemical signals of sex-specific steroid have been

shown to produce gender-specific activations in the brain, as well as impacting on autonomic nervous system responses, and on self-reported mood.

—Denise Chen

See also Sensory Development

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SMILING

Infant smiles are a prototypical expression of early joy. They are a window on the development of positive emotion. Smiles not only communicate positive engagement and happiness, they also elicit positive engagement and happiness in those around the infant (Figure 1). This interactive process of being positively engaged with another may be part of how joy and social competence develop. Early smiles also help to predict later development.

PREDICTION

Infant smiles—particularly smiles in response to ambiguous stimuli—tell us about how infants will develop. Four-month-olds who smile more in response to a mobile show a more exuberant temperamental style at 4 years when they are more likely to talk and engage with peers. Infant smiling in response to a brief period of parental nonresponsivity—when the parent stops normal play to pose a "still-face"—may index a certain emotional resilience. In comparison with infants who did not smile, 6-month-old infants who smile during the still-face are more likely to be securely attached at 12 months. Their parents also perceive them as having fewer externalizing behaviors such as being loud and rough than infants who did not smile during the parental still-face. Infants who smile when the going gets rough appear to develop socially appropriate relationships. But exactly what is a smile?

WHAT IS SMILING AND HOW DOES IT DEVELOP?

The zygomatic major muscle pulls the corners of the lips upward and sideways to form a smile. Newborn infants typically smile during states of active sleep, although infrequent smiles occur in non-sleep states as well. These early smiles sometimes have a relatively mature form, but occur against a backdrop of frequent lip and mouth movements. Through 1 month of age, smiles often occur during states of drowsiness when they are elicited by high-pitched tones. Blind infants also develop smiling during this period. After 1 month, smiles among sighted infants are increasingly elicited by visual stimuli such as gazing at a face or an image of a face. These smiles are thought to occur when the infant experiences a sudden relaxation in cognitive tension related to recognizing the visual stimulus.

It might seem advantageous for newborn infants to gaze at their parents and smile at them shortly after birth. But this activity—known as social smiling—does not develop until the second month of life. Social smiling signals the infant's active, positive participation in the relationship. Social smiling at 2 to 6 months of age is often studied during face-to-face play with a parent (Figure 1). The development of infant smiling in interaction involves both changes in the timing of smiles and in the form of the smiles themselves.

The Timing of Smiles

In early interaction, infants tend to smile (often repeatedly) while gazing continuously at their parent. The infant's positive affect, represented by the smile, appears to be dependent on continual visual contact with the parent. At 3 to 6 months of age, infant smiling becomes less dependent on the parent. Infants are more likely to initiate smiles while the parent is neither smiling nor vocalizing. Infants continue to smile during a gaze at the parent but become more likely to gaze away from the parent during the course of the smile. This suggests that infants are increasingly

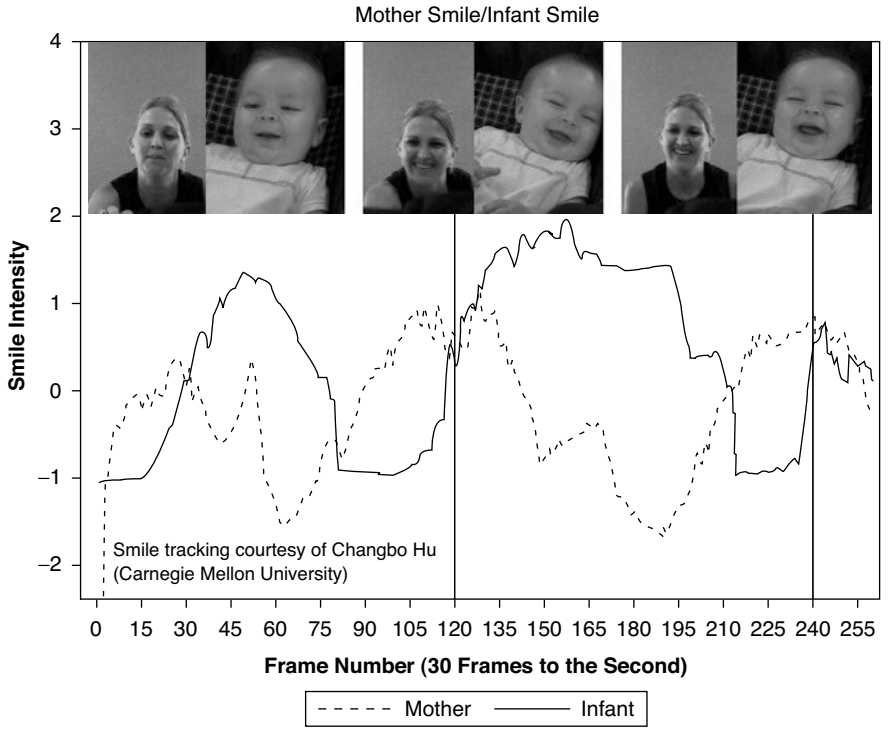

Figure 1 Social Smiling During Face-to-Face Play

controlling their own positive emotion by exercising control over both the onsets and offsets of their own smiles.

During face-to-face interactions, infant smiles are often the high point of play and may be avidly sought after by the infant's parents, relatives, and friends. Parents tend to respond to the infant's smile with a smile of their own. A parent smile makes the infant smile more likely, but certainly does not guarantee that the infant will smile. Paradoxically, infants will be more likely to smile if they are allowed time to not smile. When playing with infants, it is important to be alert to the infant's timing. Infants need time to disengage, turn away, and then look back at the person they are playing with.

The Form of Smiles and the Intensity of Positive Emotion

Infant smiles appear to be part of a process of feeling and expressing positive emotion. Infant smiles tend to occur in response to situations expected to elicit positive emotion such as peek-a-boo games. Smiles are recognized as expressions of positive emotion (even among infants with serious facial deformities). Some smiles, however, are more joyful and positive than others. Infant smiles that involve the raising of the cheeks around the eyes—the Duchenne smile, a smile of joy in adults—involve patterns of left frontal brain activity thought to be associated with joyful engagement. Infant smiles involving mouth opening also seem to involve particularly strong joy and arousal.

Smiles that involve both mouth opening and cheek raising involve the strongest smiling actions. These smiles are perceived by adults (including the parents of young infants) as more emotionally positive than other smiles. They also are more likely than other smiles to occur when the infant is gazing at its smiling parent. This likelihood grows as infants approach 6 months of age. So the form of infant smiles as well as their timing changes with development. Just as infants exercise more control over when they smile at 3 to 6 months of age, they also become more capable of using very intense smiles to participate in highly arousing social situations.

Vocalizations and laughter are another index of emotional intensity. When a vocalization occurs with a smile, it tends to begin during the smile and end before the smile finishes. Laughter is a smile-linked vocalization that becomes more common at 4 to 12 months of age, when it may signify the most intense positive emotion. Smiles and laughter accompany both physically stimulating games such as tickling (which is similar to the play-aggression games of nonhuman primates) and visual or psychologically stimulating games such as peek-a-boo. Infants in the first year of life take an increasingly active role in games like these and, more generally, in all types of interaction. This increasingly evident agency might be seen as the infant's smiles and laughs as the infant, rather than the mother, uncovers the mother's hands from the mother's face in a game of peek-a-boo.

Through 6 months of age, infant smiles reflect here-and-now emotional interchange with a partner.

By 12 to 15 months, infants are intentionally communicating to the partner about objects. How does this development occur? Anticipatory smiling—in which infants smile at an object and then gaze at an adult while continuing to smile—may be the first step. Anticipatory smiling rises sharply at 8 to 10 months of age. Anticipatory smiles seem to communicate that the infant wants to share with the adult a funny experience the infant had with a toy. These may be among the first types of communicative reference in which the infant seems to be referring to an object or experience by expressing something like, "That was a funny toy, wasn't it?"

Theorists like Alan Sroufe see smiling as a response to tension reduction, a type of arousal regulation linked to a decrease in heart rate. This helps explain similarities in a young infant's smiling response to a relatively unfamiliar face and an older infant's smiling response to a mother walking like a penguin. Both involve tension in trying to understand an event, and then sudden relaxation as the event is interpreted as having safe, familiar, and interesting elements. This interpretation is similar to the idea that joy and smiles arise when a desired goal is attained faster than anticipated. One difficulty with these ideas is that arousal is hard to measure (heart rate is sensitive to many factors) and that young infants often do not have clear goals. It is possible, however, that even in the pell-mell of play, infants are responding to interesting and arousing events that the infant has a role in creating. The infant may smile and laugh as part of the realization that these events, though arousing, are safe and part of larger patterns that the infant is in the process of interactively creating with a partner.

Both smiles and the joyful processes to which they are linked rise and fall in time. It is thought that at a moment-to-moment level, infant and parent are continuously communicating, sharing, and creating emotional information. Specifically, infant expressions of joys are mirrored and intensified by the parent, and the infant responds to this intensification with either intensified engagement or disengagement. New developments in computer vision are allowing researchers such as Jeffrey Cohn to explore these real-time interactive dynamics (Figure 1). Computer vision and other automated tools for measuring smiles will allow researchers to understand how infants and parents create joyful moments together. They will also shed light on differences between infants and parents in how they respond to one another emotionally through smiles.

—Daniel Messinger

See also Infancy, Social Development

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SOCIAL ANXIETY DISORDER

Until recently, Social Anxiety Disorder (SAD) was referred to as social phobia. The label of phobia, and the inclusion of SAD among the subtypes of specific phobia, created the false impression that pathology based on social apprehension was less severe than other anxiety disorders. Mounting evidence shows that SAD is a serious and debilitating disorder that frequently leads to social, occupational, and education disability, as well as serious correlates such as secondary mood disorders and substance abuse.

The *Diagnostic and Statistical Manual of Mental Disorders* defines SAD along several dimensions:

- Persistent fear of one or more social situations. The fear is of potential embarrassment and/or rejection.
- Exposure to the feared situation virtually always leads to anxiety (which may be described as a panic attack).
- The individual recognizes the excessive and unreasonable nature of the fear.

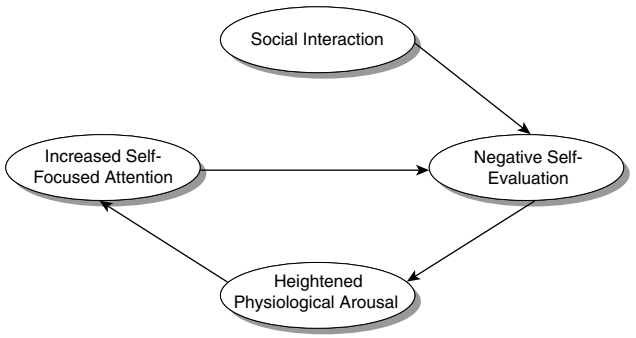

Figure 1 Automatic Negative Self-Evaluations in Social Anxiety Disorder

- Social situations are avoided.
- Significant impairment of functioning due to avoidance of social situations.
- Symptoms are not due to the effects of a substance or medical condition.

While the vast majority of people may report occasions of anxiety in social situations or the common fear of public speaking, the occurrence of SAD is far less frequent. It is the intensity of the anxiety experienced, the wider range of feared social situations, and the profound negative impact on functioning that sets SAD apart from milder instances of social apprehension.

SAD may be of two forms: specific and generalized. Some individuals experience social anxiety for a small and discrete set of social situations. However, the more severe and more common variant of SAD is the generalized type. In this case, anxiety is triggered in virtually all social interactions (e.g., meeting an individual one-on-one as well as meeting a small group of people all at once). Epidemiological data suggest that the prevalence of SAD (referred to as social phobia in the most recent surveys) is approximately 2.4% in the general population, although there are wide variations depending on culture (i.e., as low as 0.5% in South Korea, and as high as 3.0% in New Zealand).

SYMPTOMS OF SOCIAL ANXIETY DISORDER

Physiological Reactivity

It has been noted that during exposure to social situations, individuals with SAD may experience situational panic attacks wherein the physical symptoms closely resemble panic. Specifically, the SAD sufferer may experience trembling, sweating, dizziness, tachycardia, depersonalization, numbness in the extremities, and other signs of sympathetic arousal. Reacting with panic-like symptoms when exposed to social situations is frequently accompanied by increases in warmth around the cheeks, resulting in blushing.

Behavioral Features

One of the principal observable aspects of SAD involves avoidance of social interactions. This specific symptom is the key disabling feature of SAD, leading to significant personal distress among SAD sufferers. Self-report assessments, such as the Social Interaction Anxiety Scale, generally focus on the anxiety associated with social interaction. This scale, used in conjunction with the Social Phobia Scale, provides a detailed self-report evaluation of the severity of social anxiety.

Cognitive Aspects

Most models of the etiology of SAD have a prominent cognitive component that is primarily concerned with self-focused attention and self-evaluative statements that occur either during or immediately following social situations. Specifically, individuals with SAD evaluate social situations as more threatening, and others are highly likely to evaluate the SAD sufferer negatively. Numerous investigations have demonstrated experimentally that individuals with SAD consistently evaluate their performances negatively as well as make attributions that others perceive their performance negatively. The process of negative self-evaluation immediately following social interactions is sometimes referred to as the negative postmortem. These spontaneously occurring negative self-evaluations set up a pernicious feedback loop, depicted in Figure 1.

Additional Common Complicating Factors in Social Anxiety Disorder

Given the degree of anxiety experienced by individuals suffering from SAD and the ubiquity of social interactions, the SAD sufferer cannot completely avoid severe anxiety-provoking situations. This problem frequently leads to significant difficulties aside

from the primary presenting problem. For example, there is a higher probability of alcohol abuse among individuals with SAD. In addition, individuals with SAD have higher levels of depression, as well as higher levels of suicidal ideation and attempts. Finally, those with SAD are significantly more likely to drop out of school compared with other anxiety disorder groups.

Treatment Approach and Outcome

The primary psychosocial intervention for SAD is cognitive-behavioral therapy (CBT). There have been numerous trials examining CBT for SAD (or social phobia), with generally favorable results. There are two major components to this treatment package. The first involves behavioral mastery of specific situations that formerly triggered anxious responding. This frequently involves imaginal and in vivo exposure designed to develop better methods of coping with anxiety-provoking situations, as well as provide an opportunity for the clinician to assess specific cognitive distortions that contribute to the maintenance of social anxiety. The second component overlaps with the behavioral procedures and involves cognitive restructuring. This additional element is essential to train the SAD sufferer in methods for challenging the accuracy of his or her negative self-evaluations and to break the negative cycle depicted in Figure 1 that frequently leads to a real breakdown in social performance. While treatment may be conducted individually, interventions are often enhanced in social anxiety groups, where fellow group members assist by proving an opportunity for exposure and offering feedback in the service of support and mastery.

—Dean McKay and Kevin McKiernan

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SOCIAL CLASS

Everyone belongs to a certain social class. Whether one is abundant with material wealth or whether one is deprived and poor, people most usually classify oneself, others, or a group as having a certain socioeconomic status. Being part of a social class is commonly accompanied by sentiments and feelings that range from pride, security, arrogance, and contentment to inferiority, self-pity, sadness, and anger.

Social class has existed as long as material belongings and physical possession have taken importance in people's existence. In psychology, therapists and policy makers would often need to consider and be respectful of clients' and communities' potentials and limitations that are borne out of people's social class. Along with gender, age, race, culture, sexual orientation, religion, and ability, social class is an essential source of diversity that needs to be considered in practice and in research. In the field of developmental psychology and specifically in the world of children, the family's and society's social class naturally dictate the amount of resources available to children's

growth. Social class thereby has a global, direct, and subtle influence on children's capacities, futures, potentials, and, at unfortunate times, their limitations.

WHAT IS SOCIAL CLASS?

Social class is a mobile construct. Because it is most usually defined by material possession, investments, or economic acquisitions, social class is temporary and may change drastically depending on the increase or loss of this material wealth in a natural or man-made disaster, by winning the lottery, or during war and other political unrest. Moreover, it can also change gradually through time, in the event of attaining further education, in relation to a country's increased gross domestic product (GDP), or in increased inflation or habits such as addiction to gambling. The sources of one's social class include (1) structural, (2) familial, (3) interpersonal, (4) intrapersonal, and (5) circumstantial influences. Defining one's social position may be highly dictated by the structure of the society one is born into—the opportunities for employment or lack thereof; the affordability of food, clothing, housing, health care, and education; and economic well-being of one's country, in terms of inflation, inequalities, development, and technological infrastructure. Additionally, one's social class may also be highly influenced by the family one is born into—parents' wealth, presence of impending inheritance, a cycle of deprivation, intergenerational businesses and professions, or support for education. Social class is affected by interpersonal factors—other people's choices, actions, generosity or greed, the way people react to any person's gender, age, ability, race, culture, religion, sexual orientation, power, and lifestyle. One's social class may also be largely dependent on forces that are personal—personality characteristics such as resilience, perseverance, determination, and laziness, as well as the actions and decisions people make, the values and priorities people choose, and the attitudes and beliefs people have. Finally, circumstantial factors affect social class—the unexpected occurrences of error, luck, and timing.

Social class, because of its temporal and elusive nature, is often loosely defined by people in empirical research on the basis of different correlates and on the basis of standards that are often relative. Many elements influence the definition and position of any one person's social class, at any given time. Needless to say, the perspective, biases, prejudices, and stereotypes of the person needing or having to consider another's social class in research, practice, or training impacts the definition of this social class. For instance, this is exemplified by children's definition of social class, when they refer to their schoolmate as rich like them because they also have each a cellular phone in their family, or a child who says that they are poorer than their neighbor because their toys are often older and less numerous compared with their neighbor's.

CORRELATES OF SOCIAL CLASS

The correlates or indicators of social class include housing, safety, food, clothing, education, health care, transportation/mobility, and leisure. The privilege, deprivations, or amount of security experienced in one's social class is closely related to the circumstances of one's housing (i.e. where one lives, with whom one lives, the experience of privacy or density, the safety, danger, or predictability of having a roof over one's head). Whether an individual or a family lives in an apartment, a single family home, or in the streets depends on what they can afford. One's social class also affects the adequacy of food and clothing, and determines the extent to which children are hungry, undernourished, and go by without their needs met. The affordability of education, the kind of education, and the expense of education are largely influenced by the family's social class. Whether a child goes to elementary school, finishes high school, or pursues college or even graduate school certainly says something about one's cultural expectations in that social class. The experience or lack thereof of adequate and reliable health care is certainly dictated by one's social class. The experience of mobility and level of control over one's transportation highly correlates with one's social class. For instance, especially living in a place where public transportation is not accessible or efficient, not being able to afford a car, car insurance, and maintenance expenses explicitates one's social class. Although not as clear a correlate as the others, the exposure to a variety of places, people, experiences, avocations, and vacations largely depends on one's social class.

HOW IS SOCIAL CLASS ASSESSED?

In psychology, social class is often overlooked as a variable in research because of the complexity of its definition, the inherent biases and controversies in its perception, and its temporary and ever-changing nature brought by different standards and different

perspectives (i.e., social class being relative to the one defining it). Moreover, the salience of the assessment and measurement of social class is necessitated by its function. For instance, social class positions and inequalities were highlighted in research studies conducted in the 1960s in the aftermath of World War II or the Great Depression. In the current time, social class discussions and assessments come to the fore along with multicultural psychology and with the waves of immigration that highly correlate minority status with specific social classes.

In the objective sense, especially in research, social class has been assessed using one or a combination of the following: educational attainment, income, power, or prestige. In demographic information sheets and when used as a variable of study, preconceived levels, figures, or rankings have already been defined and participants are asked to identify these descriptors in order to eventually categorize their social class.

The subjective sense is the one that laypeople (i.e., nonpsychologists) rely on in assessing social class. Although qualitative researchers are starting to use the subjective measure in their studies, scientists generally tend to adhere to the objective measures. The subjective measure is one's own attribution of belonging to a level of social class that an individual identifies with. This is usually the position that the person expresses, for a number of reasons, to be the social class the person genuinely feels he or she belongs to. Using the subjective measure, for instance, a person is asked what his or her social class is, and is then asked to define or relate why that identification was made. This recognizes the categories or levels of social class the person uses and the reasons for such classification. In other instances, the individual is given a measure of 1 to 10, with 1 being poor and 10 being wealthy, and then is asked for his or her social class given the scale. The subjective measure of social class then gives the person the flexibility to use the standards, the classifications, and the labels he or she believes in, and at the same time acknowledges and respects the sense of belonging and definition of social class the person finds truthful and useful.

WHY IS SOCIAL CLASS IMPORTANT IN STUDYING CHILDREN?

Children are in positions where they are mostly helpless recipients of resources accorded to them for their growth. When studying children it is necessary to know the socioeconomic status they and their families are in, in order to assess the distribution of these resources (food, clothing, shelter, education, health care, safety), to identify their specific needs to ensure their healthy development and well-being, to inform policy makers to further advocate for the needs of our children, and to achieve higher ideals of economic equality and social justice.

The identification of social class is important in the early intervention for children. For example, the identification of poor neighborhoods and financially deprived communities facilitates the identification of social class and thereby the interventions for high-risk children, high-risk pregnancies, juvenile delinquents, emotional and behavioral problems of children, children with a tendency toward violence, and mental health risks of children. Identification of social class for children is relevant for the early detection of their needs for help, and the assurance of interventions.

Social class and the importance of social class in our studies dealing with children are certainly a point of education and intervention for the values we want to teach children. Although social class is often overlooked as a variable of study, it is often used in judging people's social positions and undeniably fuels people's self-esteem, biases, prejudices, and stereotypes. With children, then, using social class as a variable of study can potentially educate them in acceptance, respect, and sensitivity for other children and adults who are of social classes different from theirs. These studies can inculcate social justice and values of concern and generosity toward others, and can process issues of hatred, indifference, self-pity, or anger toward others who are of a different social class. And most importantly, these studies can help children develop through adulthood acknowledging the privilege, potential, deprivations, narrowness of experiences, and limitations brought on by their social class.

Children in Developed Countries

Social class is important in identifying the children in developed countries who need early intervention: children born to poor families, those who have minority status, those whose resources are distributed among many children, those who are lacking in emotional and material resources in parenting, those who are in single-parent households, those who are raised in unsafe circumstances, and those whose opportunities for the future are limited by social class.

Children in So-Called Third World Countries

In the global world and in the international community, there are many children in underdeveloped or Third World countries where the effect of social class is not just essential to look into, but is almost a moral obligation. For children in these countries, resources are scarce, and they do live in circumstances that are unique to underdeveloped countries: children raising themselves; children raised by a stranger or by extended families; children whose parent or parents are overseas workers; children in societies where health care is scarce, where there is no health insurance and social security, and where they can be easily refused for health care when they do not have resources; children who have never visited a doctor or a dentist; children who cannot afford to go to school because they are expected to work; child laborers (e.g., children having to work as cigarette and newspaper vendors, prostitutes, farmers, and construction workers); children who live in the streets; children who grow up deprived of any technology or books in their homes or even in their schools; children who are victims of war, political warfare, terrorism, and graft and corruption in their governments; and children who have difficulty discerning right from wrong because of the prevalence of violence, bribery, and deceit.

SUMMARY

Social class is a rather influential aspect of one's position in society that dictates one's past, present, and future privileges, opportunities, deprivations, and experiences. Especially for children who are mostly reliant on the resources their family's social class can offer them, a lot of their development, expectations, and attitudes in life, and the values they imbibe, are largely in the power of their social class.

—Teresa G. Tuason

See also Socioeconomic Status

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SOCIAL COGNITION

How is it that two individuals can interact with the same person yet come away with vastly different impressions of the person? Can we feel good about ourselves, yet still have concerns about our basic worth? Why do our moods have such a profound effect on our judgments and decision making? Why do we sometimes experience negative thoughts about members of certain ethnic groups? Can we control these thoughts if we want to?

Questions such as these are the focus of social cognition researchers. Specifically, social cognition is a sub-area of psychology that focuses on the mental processes that come into play when individuals interact with one another. In this sub-area, mental processes are defined very broadly. They include thoughts, feelings, and motivations, and researchers have studied the role these processes play in a wide range of behaviors such as self-perception, the perception of others, judgments of life satisfaction, and stereotyping.

As the context of investigating these topics, social cognitive researchers have raised a number of more fundamental questions about human nature. To what extent do individuals guide their thoughts, feelings, and behaviors consciously as opposed to automatically? To the extent we act in unintentional, automatic

ways, why is this so and can we do anything about it? Do our thoughts, feelings, and behavior accurately reflect our situation or are they systematically biased by self-serving, defensive motivations? Are our conceptions of ourselves stable or are they constructed in different ways in different situations?

An interesting and representative social cognition study was conducted by Baldwin and colleagues. They began with the assumption that individuals come to think about themselves more or less as they believe significant others in their life (e.g., parents, friends, teachers) think about them. If so, then it should be possible to influence the way individuals feel about themselves by changing which individuals they bring to mind. To test this possibility, Baldwin and colleagues asked Roman Catholic females who did or did not describe themselves as strict practitioners to read a description of a sexually permissive dream. Although not explicit, the description did allude to activities that were of questionable moral value for a strict, practicing Catholic. Thus, strict Catholics might not feel especially good about themselves after reading the description. This should be especially true, though, if these strict Catholics had their religious standards brought to mind (e.g., What would the Pope think about me reading that description?).

To make it likely some women in the study had these standards on their mind, Baldwin and colleagues had the women respond as quickly as they could to flashes on a computer screen. The women did this after they had read the description of the dream and before they rated themselves. The flashes were actually photographs presented too briefly for the women to detect consciously. For some participants, the photograph was of an individual unknown to them. For others, it was the Pope. If the subliminal presentations of the Pope's photograph activated the internal representation of the Pope (i.e., religious standards), then women who described themselves as practicing Catholics and who had been exposed to the Pope's picture would report the lowest feelings about themselves after reading about the sexually permissive dream. This is precisely what Baldwin and colleagues found.

This study showed that a person's momentary sense of self can be shaped by the activation of an internal representation of the presumed evaluation of a significant other. It showed more generally that individuals play an active role in determining their own thoughts, feelings, and behavior—even when they are not aware of it. This active role is what social cognition researchers investigate.

—Leonard L. Martin

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SOCIAL DEVELOPMENT

Social development is the change over time in an individual's understanding of, attitudes concerning, and behavior toward others; for example, a developmental change in how people behave with members of the other gender or their understanding of what friendship entails. These changes are perceived to occur due to socialization processes as well as physical and cognitive maturation. Socialization, however, is not a unidirectional influence, where society simply affects the individual. Instead, relationships are perceived as bidirectional. That is, the parent affects the child's development, as well as the child impacting the parent's. Initial relationships may be the most important as they serve as models of what infants and children should expect in their future relationships. Over the course of the life span, relationships with parents, siblings, peers, and romantic partners play integral roles for social development.

Because these relationships do not exist in a vacuum, they are affected by the social and cultural

contexts in which they exist. Cultural, ethnic, and religious differences affect the manner in which people interact with each other and subsequently children's development within those contexts. Individuals' gender and social economic standing (SES) also affect how they think, feel about, and behave toward others, as well as how other people respond to them.

INITIAL RELATIONSHIPS

John Bowlby, a prominent ethologist, proposed that infants develop attachments to their primary caregivers. He argued that attachments are reciprocal relationships; the infants become attached to their caregivers and the caregivers become attached to the infants. Attachments are theorized to serve an evolutionary purpose because they increase the likelihood that the caregivers will protect and care for the infant. Attachments between infants and caregivers develop gradually over time as the infants and caregivers improve their ability to read and respond to each other's signals. Typically, infants form clear-cut attachments to familiar caregivers by 7 months of age.

Attachments provide children with emotional support. The child is able to use the familiar caregiver as a secure base from which to explore his or her surroundings. Because infants look to their familiar caregivers for support, they are more willing to explore their environment when their caregivers are present than when they are absent. Caregivers also serve as sources of comfort when the infants become distressed.

Bowlby proposed that infants grow to understand what their caregivers are like and how they typically respond when the infants are stressed. These initial working models, or expectations concerning social relationships, are theorized to guide their expectations about future relationships during childhood, adolescence, and adulthood. If infants had warm relationships with their caregivers and their needs were met, they may expect positive relations with others. However, if these relationships were negative, they may expect to be hurt by others and become more defensive in future relationships.

Mary Ainsworth, a contemporary of Bowlby's, developed the "strange situation" to examine the quality of children's attachments to their caregivers. In this test, 1-year-old infants encounter a number of stressful situations, from interacting with strangers to having their caregivers leave. The children are classified into different attachment styles based on how they cope with these situations.

Children with secure attachments are distressed at separation, but are easily comforted when their caregiver returns, and are more willing to explore when the caregiver is present. Three categories of insecure attachments have been observed. Children with an avoidant attachment style tend to be unresponsive to their caregivers when they are present and display little distress at separation. These children are slow to respond or avoid the caregivers when they return. Children who display resistant attachment styles seek closeness to their caregivers and often fail to explore their environment. They are very distressed at separation and frequently display angry, resistant behavior at reunion. Finally, abused infants usually display a disorganized/disoriented attachment style. These infants often are afraid of their caregivers and display a combination of avoidant and resistant behaviors.

An important determinant of attachment style is the quality of care the infants receive. Mothers of securely attached children tend to be warm, sensitive to their children's signals, and encourage their children to explore the world. Mothers of insecurely attached children provide less sensitive parenting. Mothers of resistant children often provide inconsistent feedback; sometimes they are enthusiastic and other times they ignore the children. These babies become anxious and resentful as they realize they cannot count on their mothers for support and comfort. Two patterns of parenting styles are related with avoidant babies. Mothers of avoidant infants often overstimulate their children or are unresponsive to the babies' signals and express negative attitudes toward them. In both cases, infants learn that they can reduce negative stimulation by avoiding the parent. Whereas infant characteristics, such as being premature or having a difficult temperament, may make an insecure attachment more likely, caregiver qualities seem to be more important for attachment than the infant's qualities.

Because of cross-cultural differences in child rearing, the percentage of children who fall into the secure and insecure attachment styles varies across cultures. For example, German culture promotes independence in their children and discourages clingy behavior. Not surprisingly, German infants tend to display more avoidant attachment than do babies raised in the United States. In Japanese culture, parents rarely leave their infants in the care of strangers. Therefore,

Japanese children tend to display greater separation anxiety and more resistant attachment than do children raised in the United States.

There is significant evidence to support Bowlby's claim that early attachments influence subsequent social relationships. During the preschool years, children who were classified as securely attached tend to be more sociable with their peers and have more friends and more positive interactions with peers than do insecurely attached children. In middle childhood, children who had secure attachments have better relationships with peers and closer friendships than insecurely attached children. Furthermore, there are intergenerational effects of attachment. Adults' attachments to their parents are correlated with how their children are attached to them. This likely occurs because the parents' attachment style affects how they behave with their children. Typically the best outcomes occur when the children are securely attached to both parents and the worst outcomes are when both attachments are insecure. For the quality of the attachment to be maintained, it is necessary that sensitive caregiving continue throughout childhood.

PARENTING STYLES

In addition to warm, responsive parenting, Erik Erikson and others have claimed that a second dimension of parenting, the amount of demands and controls the parents place on their children, also plays an integral role in children's and adolescents' social development. Parents can be categorized as being either high or low on each of these dimensions (Table 1).

In the 1960s and 1970s, Diana Baumrind conducted extensive research on how parents interact with their children. She observed three patterns of parenting styles. Authoritative parents display high levels of warmth and affection and place demands on their children. These parents tend to be responsive to their children's thoughts and feelings, and encourage age-appropriate independence while placing controls on their actions. Whereas authoritarian parents also place high levels of control on their children, they display low levels of warmth. These parents tend to impose many rules and expect compliance from their children. They often rely on punitive or coercive measures to obtain obedience. Permissive parents place few demands on their children but are warm and caring toward their children. Parents often take this approach if they lack the confidence to control their children or feel it is best if the children make their own decisions. Developmental psychologists Eleanor Maccoby and John Martin added the fourth category, uninvolved parenting. These parents display little warmth and place few demands or expectations on their children.

Table 1 Classifications of Parenting Styles

	Responsive	*Unresponsive*
Demanding	Authoritative	Authoritarian
Undemanding	Permissive	Uninvolved

Children raised by authoritative parents have the best social and academic outcomes. They have high self-esteem, are successful in school, and are well liked by their peers. Children raised in authoritarian households tend to have average social and cognitive competencies and during adolescence tend to be more conforming to their peers. Children raised by permissive parents tend to have low cognitive and social competencies. They often are immature and lack self-control and are more likely to get involved with delinquent behavior than children whose parents set controls for them. The worst outcomes are associated with uninvolved parenting. These children tend to perform poorly in school, display aggressive behavior during childhood, and are at risk for delinquent behavior as adolescents.

Because these findings are correlational, the outcomes are not necessarily due to the parenting style. It is possible that easy-going, intelligent children elicit more authoritative parenting than do difficult children. As stated earlier, whereas parents influence their children, the children also impact the parents.

Working-class parents are more likely to take an authoritarian approach to parenting, and tend to display less warmth than do middle-class parents. In addition, they are less likely to reason with, negotiate with, or foster curiosity and independence in their children. These differences can be explained by the power differences in blue- and white-collar occupations. Working-class parents tend to have little power in the outside world and have to defer to their bosses. This leads to a perception of the world as hierarchical. These parents therefore stress obedience to their children, because it is a skill that will help them survive in a blue-collar world. Middle- and upper-class parents also attempt to teach their children skills that will help them negotiate their futures. These parents focus on instilling

initiative, curiosity, and creativity because these skills are relevant in a white-collar environment.

SIBLINGS

The longest-lasting relationships most people have are with their siblings. Older siblings typically assume dominant roles, such as determining which activities to engage in, or how they should be played. They tend to initiate both more prosocial and combative behavior than younger siblings. Younger siblings are more likely to imitate their older brothers and sisters. As siblings age, the importance of birth order lessens and the relationship becomes more egalitarian by early adolescence.

A number of factors affect sibling relationships, including the genders of the siblings, the age gap between them, and their relationship with their parents. Although same-sex siblings tend to be closer than brother and sister pairs, the most conflict is seen in brother-brother relationships. By middle childhood, girls tend to report more warmth and intimacy in their sibling relationships than do boys. This trend continues into adulthood, where sister relationships tend to be the strongest and most intimate. Siblings whose ages are close together tend to display more warmth and closeness but also more conflict during childhood. This occurs because there are more direct comparisons and more frequent conflict over resources or perceived unequal treatment when the age gap is small.

The treatment children receive from their parents also influences their relationship. When parents favor one child, not only does sibling antagonism increase, but the least-favored child is also at risk for adjustment difficulties. The greatest problems occur when the children believe their parents care more about one child than another.

Sibling rivalry begins with the arrival of the new baby. This typically leads to a decline in positive interactions between mothers and the older children, such as joint play, cuddling, and talking. However, negative interactions, such as restrictive and punitive behavior, increase in frequency. This can lead to jealousy if the older children associate these changes with the baby.

Sibling rivalry tends to increase when the younger child reaches 1½ to 2 years of age. The younger siblings can now try to hold their own by hitting back or getting the parents' attention. Sibling rivalry continues increasing into middle childhood and is usually more intense when the children are the same gender or are close in age. Sibling rivalry declines during adolescence as the siblings develop their own social worlds and the frequency of their interactions with each other decreases.

There are a number of positive aspects to sibling relationships. First, they can provide social support. Older children can provide emotional support when their younger siblings are dealing with uncertain situations. Sisters play an important social support role, because relationships with sisters are more intimate. Second, older children can serve as models or tutors to their siblings. They can help their younger siblings master cognitive, physical, or social tasks through direct instruction or modeling behavior. Both older and younger siblings benefit from the tutoring. Children who tutor their siblings tend to do better on academic aptitude tests then same-age children who do not have these experiences. Third, interactions with older siblings aid in younger children's social cognitive development. This helps younger children develop social skills and enhance their emotional understanding and perspective-taking abilities.

PEER RELATIONSHIPS

Parents both directly and indirectly influence their children's peer relationships. Parents choose which neighborhoods they live in, which schools and religious services they attend, and whether or not they participate in after-school programs. These decisions affect who their children's potential peers are. Furthermore, they act as gatekeepers or booking agents in scheduling play dates for young children. Parents also serve as positive or negative role models of how to act toward others, and they can actively coach how to deal with peers. Finally, the parenting style they employ is related to peer sociability. Children raised by authoritative parents tend to have better social skills than those raised by authoritarian or uninvolved parents.

This is important because children's social skills strongly affect their popularity. Popular children tend to be calm, outgoing, and friendly. They act prosocially and are rarely disruptive or aggressive. In addition, they tend to have better perspective-taking skills than their peers. Two patterns of social interaction styles have negative consequences for popularity. Hostile, impulsive children tend to be poor perspective takers and often interpret other children as having a hostile intent. Because of this perspective, they are more likely than others to respond to other children's behavior with aggression. Children with this interaction style are at risk for becoming delinquent adolescents.

A subset of withdrawn children are passive and socially awkward. These children are aware that others dislike them and expect their peers to treat them poorly. They are very sensitive to negative feedback because this information supports their belief that they are disliked. Because of this, they tend to have a submissive interaction style and withdraw from social interactions. Subsequently, they often feel lonely and are at risk for depression and low self-esteem. However, not all children who have low rates of interactions with others are socially inept. Some of these children are socially well adjusted but just have a preference for interacting with only a few friends.

Physical appearance also impacts popularity, because attractive children tend to be more popular than their unattractive peers. The timing of the onset of puberty is influential as well. Boys who mature early tend to be more popular than later maturing boys. As early maturers are bigger and stronger than their peers, they excel in sports, which boosts their social status. In contrast, early maturing girls tend to be slightly less popular than later developing girls. Because these girls are the first in their cohort to reach puberty, they are likely to be teased, especially by the boys.

Gender differences in peer relationships begin much earlier than the onset of puberty. During early childhood, children begin to show preferences for playing with their own gender. Girls prefer to play with other girls by age 2, and boys start to prefer playing with other boys the following year. Young children not only prefer same-sex playmates, they also actively avoid the other gender. Because children segregate along gender lines, boys and girls live in different social worlds. Among other distinctions, boys and girls differ in their style of play, toy choices, what they do with their friends, and how they deal with conflict.

Boys are more active and aggressive, and are more likely to engage in rough-and-tumble play than girls. Furthermore, boys tend to play in larger groups and play more competitive games than do girls. Boys' groups tend to develop dominance hierarchies with power plays to determine where each child stands in the group. Because boys are concerned with their status within the group, their communication often focuses on dominance. When conflict arises, such as a fight over toys, they are likely to use verbal or physical aggression to resolve it.

In contrast to boys, girls are more vocal and nurturing. They are more likely to play with only one or two best friends. These friendships tend to be emotionally close and intimate. Typically, girls claim to have closer friendships than boys do from middle childhood on. When conflict does occur, girls are likely to compromise and try to work things out. When girls act aggressively, it is more likely to be an attempt to hurt someone's social relationships than to cause physical harm.

Children base their friendships on shared activities—the people they do things with. By adolescence, friendships become more focused on trust and intimacy, especially for girls. Adolescent girls turn to their friends for emotional support and understanding. Although adolescent boys disclose more to their friends than they did as children, they primarily continue to base their friendships on shared recreational activities.

In addition to the changes in the intimacy of friendships, a number of other changes occur in the transition to adolescence. Both the size of peer groups and their gender makeup change from childhood to adolescence. Cliques, which are small groups of approximately five or six friends who spend most of their time together, develop during preadolescence. Clique members usually are similar in terms of their gender, age, grade, and ethnic background. Larger reputation-based groups, called crowds, emerge in adolescence. Crowds are mixed gender groups that can contain multiple cliques. Crowd members tend to share similar norms, values, and interests. A crowd, such as jocks or brains, not only provides a group identity to adolescents but also a status level within the peer context.

Australian ethnographer Dexter Dunphy proposed a model of how peer group structures change during adolescence. Initially, boys and girls are relatively isolated from each another because they mainly associate with members of their same-sex cliques. In Dunphy's second stage, crowds begin to form as boys' and girls' cliques begin to interact at an intergroup level. Dating ensues between the higher status boys and girls in the third stage. These individuals serve as models for romantic relationships as well as mentors for the other members of their cliques. Crowds become fully developed in the fourth stage, as the youth begin to interact with members of the other sex at an interpersonal level. Finally, in the last stage, crowds begin to disintegrate, leaving loosely associated groups of couples.

There is considerable support to the premise that these changes in peer group structure influence dating and romantic relationships. Youth who had close other-sex friends during early adolescence are more likely to be integrated in mixed-sex social networks in mid-adolescence. This, in turn, is related to an

enhanced likelihood of being in a romantic relationship. Furthermore, interactions with other-sex peers are associated with social and romantic competence.

Dates in early adolescence tend to be superficial and often occur in group settings. Whereas early dating relationships provide an opportunity to engage in leisure activities and explore sexual feelings, attachment and caregiving are not central to these relationships. According to B. Bradford Brown, a psychology professor at the University of Wisconsin, youth focus less on the qualities of their romantic relationships and more on characteristics of themselves during this phase of adolescent dating. This initial foray into dating provides adolescents with an opportunity to gain confidence in their ability to relate to the other gender and to view themselves as capable dating partners.

In the next developmental phase, youths focus on how their romantic relationships will be perceived by their peers. For status reasons, simply having a romantic partner may be more important than the relationship itself. Whereas a relationship can enhance an adolescent's status, it is important that the relationship be with the "right" type of partner. Dating the wrong person or performing non–socially accepted dating behaviors could damage a youth's social status.

Youth subsequently orient away from how their relationships are viewed by others toward a focus on the relationship itself. This occurs when they become more confident in their ability to interact in romantic relationships as well as more accepting of their reputation and social status among their peers. At this point, true attachments to romantic partners can be formed. Because these relationships are more emotionally intense and intimate, they tend to be more satisfying then those in the previous phases. In late adolescence or early adulthood, a third shift is proposed toward a focus on whether to form a long-term commitment to the romantic partner.

Adolescents with withdrawn or aggressive interaction styles may face problems developing healthy romantic relationships. Withdrawn adolescents may have difficulty entering into same-sex cliques and subsequently into mixed-sex peer groups. Thus, these youth are likely to lack the learning environment provided by informally dating within the peer group. This becomes problematic when they begin to date because they lack a support network to explore ideas related to romantic relationships and they may have problems developing the right level of intimacy with romantic partners.

Aggressive youth face a different set of problems. Although these teenagers have a peer group, it consists of other delinquent youth. Therefore, their romantic partners often display antisocial behaviors as well. Because these adolescents have developed aggressive interaction styles, their romantic relationships are at risk for psychological and physical aggression. In addition, they tend to engage in earlier sexual activity than their peers.

Maturing early also places adolescents at risk because they tend to begin romantic relationships earlier than on-time or late-maturing adolescents. Early-maturing girls tend to date older boys who frequently have a delinquent orientation. This places these girls at risk for both deviance and early sexual activity. Unfortunately, not only do early-maturing girls typically engage in sexual activity prior to their peers, but they also are at a higher risk for acquiring sexually transmitted diseases and becoming pregnant.

ADULT RELATIONSHIPS

In Brown's fourth phase of romantic relationships, people search for partners to whom they can commit long term. Finding a marriage partner seems to be beneficial, because people who are married tend to be happier, healthier, and wealthier than unmarried people. One explanation for this effect is that people with these qualities are more likely to get married. However, there seem to be actual benefits to marriage because people who have lost their marriage, such as widowed and divorced individuals, tend to do worse than single individuals. This finding implies that the benefits of marriage are not solely due to a self-selection effect.

In terms of emotions and psychological well-being, men seem to benefit from marriage more than women do. More men report being happily married than do women, and being married is related to gains in men's physical and emotional health. For women, relationship quality is more important than just whether or not they are married. Marriage seems to be beneficial for women if the relationship is going well; however, if the relationship is going poorly, women tend to suffer more than do men. One possible reason for this gender difference is that men are more likely than women to only have their spouse as a significant outlet for emotional intimacy and social support.

Gender differences also are observed in other family relationships. Because women seem to be

better at kin-keeping skills, such as calling, sending birthday cards, and visiting, family relationships involving women tend to be closer than those involving men. Because they tend to have poorer kin-keeping skills, men are at greater risk for losing intimacy with their children after a divorce. This gender difference also is observed when examining adults' relationships with their parents. Daughters are more likely than sons to provide direct social support and care to elderly parents. When sons are the primary caregivers, they tend to be managers of care rather than direct providers.

People's longest-lasting relationships are with their siblings. Sibling relationships tend be more important early and late in life. During early and middle adulthood, sibling relationships become more secondary because adults tend to focus on their families and careers. Siblings become a more important source of support in late adulthood. Strong relationships with sisters during late adulthood seem to be protective against depression, but close relationships with brothers do not. The positive impact of relationships with sisters is probably due to the high levels of intimacy in these relationships.

People's relationships with their peers also change throughout adulthood. The number of friends people have tends to decline after young adulthood as their family and career concerns take precedence. However, the number of close, intimate friendships tends to remain stable throughout adulthood. As in earlier stages of life, women's friendships tend to be more intimate friendships than men's. Whereas women often discuss personal issues with their friends, men are more likely to engage in leisure activities.

COMMUNITY EFFECTS

About 20% of U.S. infants and children live in families below the poverty threshold. Children and adolescents growing up in poor neighborhoods are more likely to deal with crowded housing, poor-quality schools, inadequate nutrition and health care, and the presence of violence and drugs in their community than those from middle- or upper-class neighborhoods. Thus, it is not surprising that living in a low-SES neighborhood is related to negative outcomes on a wide range of variables. Children in these neighborhoods are at greater risk than those in middle- or high-SES neighborhoods for poor physical health; lower intellectual attainment and poor school performance; social, emotional, and behavioral problems; and engaging in crime, delinquency, and high-risk sexual behavior. Typically, the worst outcomes are for children and adolescents living in extreme or enduring poverty.

Three theories have been proposed to explain the effects of poverty on child and adolescent outcomes. The first model is that the quality, quantity, and diversity of community resources, such as schools, social services, recreational and social programs, and employment, mediate well-being. The second model is that parent attributes and characteristics of the home environment mediate the relationship between the parents' and children's well-being. Because these parents are often under economic hardship and stress, their ability to provide quality parenting to their children is negatively influenced. A number of studies have found that parental stress is related to low warmth and harsh parenting. High parental warmth and monitoring of the children seem to be protective factors against the negative effects of low-SES environments. The third model is that formal and informal community institutions act to monitor the residents' behavior in line with social norms. However, in poor neighborhoods, especially where there are high rates of single parents, there tends to be less social organization and subsequently higher rates of crime and vandalism. This is compounded because when there are low levels of neighborhood monitoring, peer groups tend to have negative effects on adolescent outcomes.

—Joshua Susskind

See also Antisocial Behavior, Prosocial Behavior

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SOCIAL SECURITY

In the United States, the term *Social Security* typically refers to the federal Old-Age, Survivors, and Disability Insurance (OASDI) program. This program provides three separate types of benefits. First, it provides cash benefits to retired workers and their spouses and dependent children. Second, it provides cash benefits to the surviving spouses and dependent children of deceased workers. Finally, it provides cash benefits to disabled workers and their spouses and dependent children and pays for rehabilitation services for disabled workers.

One of the country's largest and most successful social welfare programs, Social Security covers about 96% of the workforce. In July 2004, the program paid over 47 million beneficiaries a total of $40 billion in monthly benefits. This included almost 30 million retired workers receiving an average monthly benefit of $926, almost 5 million widows and widowers receiving survivor benefits averaging $878 per month, and more than 6 million disabled workers receiving an average monthly benefit of $866. (The other beneficiaries included spouses and children of retired and disabled workers.)

Social Security constitutes the largest single source of income for most elderly Americans. Indeed, it accounts for more than half of all income for two out of three elderly beneficiaries. When Social Security was originally enacted in 1935, 50% of the elderly lived in poverty, and the poorhouse was a reality for many older Americans near the end of their lives. Today, in contrast, only about 12% of the elderly are subject to poverty, thanks in large part to Social Security.

Social Security is a contributory system; that is, it is funded by contributions or payroll taxes imposed on employers and employees. The Federal Insurance Contributions Act (FICA) requires that employers and employees each contribute 6.2% of wages, up to a maximum taxable wage base (equal to $87,900 in 2004) that is indexed for inflation, to fund old age, survivor, and disability benefits. The contributions are mandatory; employers and employees cannot opt out of the system.

The compulsory character of the Social Security program serves a number of purposes. First, it permits the program to redistribute protection from the higher paid to the lower paid. Second, it prevents the problem of adverse selection that would occur if individuals could decide whether, and to what extent, they wanted to participate in Social Security. Finally, the system's mandatory nature reduces the need for public assistance by requiring the improvident to pay their share of their future retirement needs.

Social Security benefits are typically paid in the form of a life annuity; that is, beneficiaries receive a monthly benefit for life. Unlike most private pensions, Social Security benefits are adjusted each year for inflation. The amount of benefits is calculated through the use of a complex benefit formula. The old age benefit formula bases benefits on workers' average earnings over a 35-year period. The disability benefit formula is similar but may base benefits on fewer than 35 years of earnings.

The benefit formula is progressive in that it replaces a higher percentage of income for lower-wage workers than for higher-wage workers. Thus, in absolute dollar terms, higher-wage earners receive more benefits (larger benefit checks) than do lower-wage workers, but the benefits of higher-wage workers replace a smaller percentage of their average earnings than do the benefits of lower-wage workers. In 2004, the Social Security Administration estimated that Social Security benefits would replace about 57% of the average earnings of low-wage workers, 43% of the average earnings of average-wage workers, and 35% of the wages of high-wage earners.

Under current law, a worker is entitled to receive "full benefits" at "normal retirement age." From the inception of Social Security until 2000, the normal retirement age was 65 years, but for workers born in 1938 and after, the normal retirement age is gradually increasing to 67 by 2022. A worker may elect to receive actuarially reduced benefits as early as age 62; benefits for these workers are reduced because workers who retire earlier are likely to receive benefits over a longer period of time. Similarly, workers may delay the receipt of benefits beyond normal retirement age and receive increased benefits to reflect the shorter period of time they are likely to receive benefits.

Upon reaching the normal retirement age, the spouse of a retired or disabled worker is entitled to receive a spouse benefit equal to 50% of the worker's benefit. The spouse may elect to receive an actuarially reduced benefit as early as age 62. The surviving spouse of an insured worker is entitled to receive a surviving spouse benefit equal to 100% of the deceased worker's benefit if the surviving spouse is age 65 or older. Surviving spouses as young as age 60 may elect to receive an actuarially reduced benefit. Dependent children may also receive benefits of 50% of the worker's benefit in the case of a retired or disabled worker or 75% of the worker's benefit in the case of a deceased worker. Family benefits, however, are limited to a maximum of 150% to about 188% of the worker's benefit, depending on the size of the benefit.

Social Security began as a relatively small and discrete program. As originally enacted in 1935, it covered about 55% of the civilian workforce, provided for limited monthly benefits solely for workers, and benefits were set to begin on January 1, 1942. In 1939, however, before the first benefits were paid, the system was completely revamped. Under the revised program, benefits were extended to wives, widows, and children, benefit amounts in the early years were substantially increased, and the payment of benefits was advanced to 1940. In 1950, coverage was extended to most self-employed individuals, and in 1956 disability insurance began. Over the years, Congress has tinkered with the benefit formula and made other adjustments, but the program has retained its basic form since 1956.

When originally enacted, Social Security provided for the creation of a substantial reserve to fund future Social Security benefits. The creation of such a reserve, however, was widely criticized, and Congress amended the program in 1939 to increase benefits to the first generation of retirees and shift the program towards a "pay-as-you-go" system where current contributions are used to fund current benefits. In 1977, and again in 1983, Congress amended Social Security to move away from a pure pay-as-you go system toward a system with temporary partial-reserve financing where reserves are built up for a few decades and then used to pay for future benefits. Thus, under the system today, most current contributions are used to finance current benefits, although some current contributions are set aside in a trust fund to fund future benefits. The trust fund reserves are currently invested in interest-bearing U.S. Treasury bonds and totaled $1.5 trillion at the end of 2003.

As a result of Social Security's pay-as-you-go financing and changing demographics, Social Security faces serious long-term financing difficulties. Specifically, in 2004, Social Security's Board of Trustees predicted that contributions to the system will exceed benefits paid by the system until 2018. Beginning in 2018, Social Security will need to draw down the assets held in the trust fund in order to pay full benefits, and the trust fund itself will be exhausted by 2042. At that point in time, under present tax rates, contributions will only cover 73% of scheduled benefits in 2042 and 68% of scheduled benefits in 2078.

There are two principal demographic changes behind Social Security's long-term financing difficulties. First, life expectancy is increasing. When the first Social Security benefits were paid in 1940, a 65-year-old man had a life expectancy of 12 years and a 65-year-old woman had a life expectancy of 13 years. Today, in contrast, the average 65-year-old man has a life expectancy of 16 years while the average 65-year-old woman has a life expectancy of 19 years, and life expectancy is expected to continue to increase. Second, 79 million "baby boomers" will begin retiring in 2008, and the baby boom generation is followed by much smaller generations. As a result of these changes, there will be fewer and fewer workers supporting more and more retirees. Currently, there are about 3.3 workers paying into Social Security for every beneficiary. By 2040, the ratio of workers to beneficiaries is expected to drop to 2 to 1.

The American Social Security program is not alone in facing long-term financing difficulties. Retirement systems throughout the Western world are facing similar demographic shifts, and thus similar financing difficulties. In recent years, many European countries, including France, Italy, Sweden, Switzerland, and

Germany, have amended their retirement systems to address these funding difficulties.

Experts throughout the United States generally agree that the American Social Security system should also be amended to address its long-term financing difficulties. Experts, however, disagree about how the system should be reformed. Some experts contend that the system should be "partially privatized" so that some, but not all, benefits are provided through prefunded individual accounts. Other experts contend that the current structure is fundamentally sound and only modest changes, such as a modest increase in the normal retirement age or a modest increase in the payroll tax, are necessary to address the system's long-term deficit.

—Kathryn L. Moore

See also Poverty

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SOCIETY FOR RESEARCH IN CHILD DEVELOPMENT

The Society for Research in Child Development (SRCD) is an organization of more than 5,000 members from various academic disciplines concerned with the study of child development. Disciplines include, but are not limited to, anthropology, home economics, linguistics, neuroscience, nursing, nutrition, pediatrics, psychiatry, psychology, public health, and sociology. In addition to being multidisciplinary, the society's membership is also international.

The child development movement in the United States started in the early 1920s, but its roots are much earlier. In contrast to many sciences, it arose from external pressures broadly based on desires for better health, rearing, education, legal, and occupational treatment of children. Movements related to child health, child study, and mental hygiene were prominent by the late 19th and early 20th centuries. From these activities came the conception of the child as a responsibility of the society at large.

The scientific status of the field of child development received formal recognition in 1923 through the appointment of the Committee on Child Development, appointed by the National Research Council, a division of the National Academies of Science. The purpose of the committee was to integrate research activities and to stimulate research in child development. In 1927 the first volume of *Child Development Abstracts and Bibliography* was published, SRCD's first publication, which continued until 2000.

In 1933 the Committee on Child Development disbanded and the newly organized Society for Research in Child Development emerged. The mission of SRCD is to promote multidisciplinary research on infant, child, and adolescent development in diverse contexts and its life-long implications; to foster the exchange of information among scientists and other professionals worldwide; and to encourage applications of research-based knowledge.

The society currently publishes three journals:

Child Development—published bimonthly; contains original articles on development research and theory.

Monographs of the Society for Research in Child Development—published four times each year; consists primarily of comprehensive reports of large-scale research projects or integrated programs of research.

Social Policy Report—published quarterly; each issue focuses on a single topic affecting children, youth, or families and includes analyses of legislation and syntheses of research on issues of social policy and children.

The society hosts a biennial meeting with attendance of more than 5,000. These internationally attended meetings include individual research reports, symposia, invited lectures, and discussion sessions, among other timely and historical programs.

Sixteen percent of SRCD's members are from nations outside the United States, representing over 50 countries throughout the world. Special efforts are made by the society to increase communication and interaction among researchers in human development throughout the world. The society also has a commitment to research and training in diversity. Increasing and disseminating research on children from many racial and ethnic minorities is a specific goal.

The society maintains the Office of Policy and Communications (OPC) in Washington, DC. The director supervises the SRCD Fellows Program in Child Development. The goals of this program are to

contribute to the effective use of scientific knowledge, to educate the scientific community about public policy, and to establish effective liaisons among scientists, federal, and congressional offices. Fellows spend a year in federal agencies or in congressional offices working to facilitate the translation of findings of research to societal issues regarding children and families. The OPC also has programs to communicate research to the media and to the public.

The society welcomes persons interested in child development. Membership is open to any individual actively engaged in research in human development or any of the related basic sciences, and/or engaged in teaching relevant to human development, or otherwise furthering the purposes of the society. SRCD is located at 3131 S. State St. Suite 301, Ann Arbor, MI, 48108.

—John W. Hagen and Nicholas G. Velissaris

Further Reading and Reference

Society for Research in Child Development, http://www.srcd.org

SOCIOBIOLOGY

The study of ethology stresses how behavior is seen within a gene-environment interaction with an emphasis on the influence of ecological factors on genetically based behaviors. Although one's genetic endowment takes precedence, environmental factors and selective pressure to change are critical components as well.

A more recent extension of some of these ethological principles helps form a relatively new discipline called sociobiology or psychobiology. A major difference between ethology and sociobiology is that sociobiologists view all aspects of development as being controlled and caused by specific genes and very little importance is given to factors that originate outside the organism.

Not a great deal of research has been done applying sociobiological principles to human behavior. It is primarily for this reason that the limitations of such a new approach have to be considered, but at the same time appreciate its suggestions for different and perhaps better ways of understanding development.

THE THEORETICAL OUTLOOK

One of the ongoing arguments as far as human development is whether humans are distinct and separate from their primate ancestors (such as great apes), or are simply a continuation or an extension of them, only at a more "advanced" level.

Most ethologists would agree that human's ancestors contribute a great deal to their current repertoire of biological and psychological potentialities. Sociobiologists would agree with this as well, but would take this argument one step further and discuss biological and psychological determinism.

They contend that the continuity between an individual's current evolutionary status and that of the immediate and past genetic ancestry is almost unbroken. What this means is that, first, the actions of genetic endowment as the cause of behavior are paramount. Second, it means that humans are not as morally and spiritually unique as some people would like to think. In fact, most sociobiologists believe that even our most prized attribute—that of altruism or sacrifice—has a genetic basis.

Sociobiology has been popularly defined by Edmund Wilson (a very important influence) as the systematic study of the biological basis of all social behavior, with social behavior defined as the interaction between organisms. The ardent sociobiologist has no qualms about considering even the most complex of human behaviors, such as the selection of a spouse or the rearing of children, as having a biological basis in nature. These complex behaviors are the outcome of millions of years of evolutionary "progress," do not result from learning, and are highly similar to the same category of behaviors in other animals in form and function.

The task of the sociobiologist is to study the social acts of animals and demonstrate how the animal's actions assist the developing organism in adapting to its environment. More specifically, the "prime directive" of the organism becomes the development of such patterns that contribute to the successful reproduction of the species, often at any and all costs to the parent generation.

For example, it is not uncommon in the animal world for parents to sacrifice their food, shelter, and at times their very lives for their young. All of these sacrifices represent an effort to increase the chances of the young to prosper and reproduce. In terms of human behaviors, we can look to the Eskimos for such an example of the ultimate sacrifice within this sociobiological model.

In the Eskimo culture, grandparents retain a position of honor and respect. This deference comes from the real and legendary sacrifices they have made for their young when it was time to find a new home, yet the amount of supplies were not sufficient to carry all the family members through to the journey's end. Instead of eating their share of food at the expense of the other (younger) people in the tribe or family (and the breeders of the next generation), they would forgo their share, stay behind, and quietly die.

A sociobiological interpretation of this would be that the grandparents, who have lived a full and rewarding life, made the only choice they could. This was a sacrifice, on an individual level, for the good of the entire tribe, to ensure that the species (and the gene pool) continued to survive. Furthermore, the motivation for such sacrifice comes not from the recognition these people will receive as honored and revered members of the society, but theoretically from one's genetic inheritance.

The major problem with this argument, however, is that it is certainly impossible to adequately test, let alone prove. The notion that people sacrifice certain things, and even their lives under specific conditions, can either be the result of some genetic predisposition or in fact a learned or culturally acquired phenomenon. The only way to settle the question would be to manipulate one's genetic potential and observe the outcomes in future generations. We might be able to do this with fruit flies in the laboratory, but certainly not humans. We have neither the technical capability to accomplish this, nor the ethical and social mechanisms to deal with such experimentation.

THE CAUSES OF BEHAVIOR

Sociobiologists believe that there are two general categories of causes that we can look to for an understanding of what precipitates animal (including of course human) behavior. These are called first level and second level causes.

Second level causes, which are further removed from the actual behavior (or less directly influential), consist of phylogenetic inertia and ecological pressure. These in turn influence what are called first level causes, identified as demographic variables, the rate of gene flow, and the coefficient of relationship. All of these result in what we generally know as social behaviors, leading up to the reproduction of the species and the sharing of the most adaptive genes.

Both of these categories of causes are somewhat "removed" as direct influences on behavior. First level causes are, however, more immediate and more traceable as influences. That is, they are more closely related, and perhaps more clearly a cause of the specific behavior or pattern of behavior under consideration.

SECOND LEVEL CAUSES OF BEHAVIOR

The first second level cause is phylogenetic inertia, which emphasizes the strong nature orientation of sociobiology. In the sociobiological sense, phylogenetic inertia can be defined as the tendency to remain genetically unchanged or the tendency to continue as formulated. It is the ease with which an organism's genetic endowment and tendencies might be alterable. In some cases this inertia may be high, and change is difficult to accomplish, while in others the opposite may be the case. What are some factors that might be involved?

Four factors determine the degree of phylogenetic inertia that is associated with any pattern of behavior. The first of these is the degree of genetic variability that exists in the species. The higher the degree of variability (and the accompanying increased opportunity for new combinations of genes to take place), the lower the inertia or the resistance to change on the part of the organism. This also means that there is an increased likelihood of generating new and more adaptive behaviors, a very important function for all animals to be able to perform. On the other hand, if there is very little variability available, then the level of inertia will probably be quite high. In sum, an opportunity to increase the gene pool decreases phylogenetic inertia since more new material is being introduced, and the likelihood of a change increases.

Antisocial factors are the second determinant, or anything that encourages the species (as represented by the individual) to isolate itself. In doing so, the likelihood of increased genetic variability goes down (because of fewer potential partners to chose from), phylogenetic inertia increases, and there are reduced chances for adaptive changes. This is clearly an argument against inbreeding of species. Not only does it exaggerate the recessive and often nonadaptive traits and characteristics, but also minimizes the chances for genetic variability. A sociobiologist would argue that the social taboos we have against incest have their

origin at this level of isolation from other sources of potential variation.

The third factor is the complexity of the behavior. The more elaborate the behavior is, the more component parts there are likely to be to the behavior. The more component parts, the higher the inertia needs to be to keep these parts together and functioning, hence the more difficult the behavior may be to change. This can be seen while examining such a complex human behavior as parenting, which consists of a great number of highly interrelated and complex behaviors. The very reason why it may be so difficult to change one's parenting practices (as any parent will tell you) is because the phylogenetic inertia associated with these complex practices is so high.

Finally, the last factor is the effect of the change in behavior on other traits and characteristics. If a behavior is complex (and, as we have just argued, the phylogenetic inertia is high), it takes a major effort to alter the behavior. When one part of a complex system is altered, it probably results in the alteration of other parts as well. In others, the degree to which a change in one part of the system affects a change in another part of the system helps to determine the degree of phylogenetic inertia.

The next of these two kinds of second level causes is called ecological pressure, most simply defined as aspects of environment that encourage the organism to change. For the sociobiologist, ecological pressure represents the nurture side of the nature-nurture debate.

As one might expect, certain ecological or environmental events have no impact on the social evolution of animals, while others are very important. For example, one of the most significant forms of ecological pressure is the presence of predators. This is because predators are probably the primary threat to the animal's existence, and therefore to the passing on of that animal's most adaptive genes.

Given this pressure, what has evolved among all animals are very sophisticated and well-designed means for defending oneself against predators. For example, a primary predator of the brown sparrow is the hawk, which will attack these small birds in flight. When a hawk is flying below the sparrows, and they are not threatened, the sparrows usually fly in a loose grouping. When the hawk is above the sparrows, however, and in position to strike, the sparrows bind together in a closely knit flying group. The hawk is much less likely to try and penetrate the group and risk injuring a vulnerable part of its body. Consequently, the likelihood of survival for the sparrows increases, and the opportunity for them to pass on their genetic endowment to a subsequent generation is increased as well.

Another major source of ecological pressure is the availability of food. Most directly, when food is not available, it is impossible for a species to survive. In such a situation, animals are forced to move on to a new location where nourishment might be more available. For example, many African animals are nomadic in that they move seasonally from location to location following the growth of certain types of plants to feed on. Even today, in some less technologically advanced cultures, tribes follow herds of animals for food and other necessities, such as hides for clothing. It is only relatively recently that humans have learned how to make food grow in spite of hostile environmental conditions.

Probably the most applicable example of a change due to ecological pressure in the human species is when we made the transition from being a tree-based animal to one that was land based. We began to walk on all fours at first, then later used our hind legs to eventually assume an upright posture. Some sociobiologists believe there was pressure for us to leave our loftier heights to have better access to food. One of the consequences of a more upright posture is a larger and stronger pelvis to help support the viscera and upper body.

A larger pelvis also allows for another change in human evolution, the easier delivery of the newborn with less potential for damage from coming through a too-small birth canal. As our heads became larger, more adaptive changes occurred in the structure of the female's body to compensate.

Finally, as E. O. Wilson concludes, "manipulation of the physical environment is the ultimate adoption," since it is not until animals manipulate their environment that they seek to control it. And, as Wilson notes, once animals control their environment, the indefinite survival of the species can almost be assured. Humans have made tremendous gains in controlling their environment in a very "short" period of time on the evolutionary clock. Once we discovered the use of tools such as bones to beat animal skins, we in a sense were on our way.

The control we have of our environment has increased dramatically through the design and use of tools, including everything from the wheel and plow to the space shuttle. The past half century of human

progress has seen incredible increases in human ingenuity and tool usage, but less than comparable progress in adapting to the social impact of these advances. The implications of manipulating genes, maintaining life when there is no mental activity, and going beyond our own solar system (as radio waves are about to do) leave an opening in our evolutionary progress. This opening suggests that the ecological pressures associated with these "advances" are so great that the adaptation process is slow and almost, at times, unnoticeable.

—Neil J. Salkind

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SOCIOECONOMIC STATUS

Socioeconomic status (SES) is a construct of great importance to the study of human development. Much controversy exists among researchers in the field about the definition and measurement of socioeconomic status. Bornstein and Bradley in 2003 pointed out that there is little debate, however, that SES bears meaningful relation to developmental outcomes and that those of higher SES have greater access than those of lower SES to many resources useful for supporting positive development. Although our understanding of the nature and course of SES-developmental relations is in its infancy, the robust relations that SES shares with cognitive, health, and socioemotional indicators supports its study as a variable of primary interest and as a control in developmental research.

Socioeconomic status can be defined in basic terms as one's position in a stratified society, where people are rank ordered according to the amount of a socially valued commodity they possess (Wohlfarth, 1997). Such a commodity can be skills, education, income, social connections, or another valued good. The functional necessity of stratification is assumed; that within a society there are certain positions to be filled and that these positions have different values for the survival of the society. Furthermore, the proposed basis for stratification lies in individual characteristics, implying some degree of personal responsibility for one's position. Within this frame, your place in society or socioeconomic status is important because it reflects implicitly your prestige.

This definition demarcates the boundaries between SES and social class. Whereas SES is situated within a model that presumes a functional necessity of stratification, prestige as the basis for one's position, and quantitative gradations in status, social class theories suppose oppression as the genesis of stratification, control as the basis for one's position, and conflictual relations between qualitatively distinct levels in the social hierarchy (Wohlfarth, 1997). The distinction between SES and social class highlights issues unique to the study of SES, such as the inextricability of socioeconomic status from socioeconomic inequality and the potential for individually powered status mobility.

Socioeconomic status can be conceptualized as a function of capital. Traditional models represent SES through combinations of three specific forms of capital: income, education, and occupation. The Hollingshead four-factor index of social status (Hollingshead, 1975), for instance, is based on the education and occupation of each employed householder in the home, where *householder* is defined as a person who has or shares financial responsibility for maintaining the home and supporting the family members living there (Hauser, 1994). Such representations are well tested and tend to bear meaningful relations to developmental outcomes. They fall short, however, of fully capturing the complexity of certain persons' roles in relation to the family's status, such as a retired grandparent who has substantial wealth tied up in investments, a mother with a doctoral degree who is staying home to raise her children while her husband works, or a teenage father who does not reside in the family household but takes care of his children each day.

Current models often take a broader focus and represent socioeconomic status using Coleman's 1988 concept of financial capital, human capital, and social capital. These categories allow for the inclusion of a wider array of status indicators than traditional representations and may better capture the complexities of socioeconomic position. Financial capital includes

income and occupation as well as indices of wealth such as accounts and assets. Human capital incorporates formal education and other training and skills. Furthermore, social capital taps the resources achieved through social connections. Such an interpretation of SES is better able than traditional models to account for potential access as well as realized access to resources. A drawback is that the terms of financial, human, and social capital are vague and encompass a wide variety of constructs, leading to challenges in interpreting and comparing demonstrated relations to developmental outcomes.

The case of financial capital exemplifies important measurement challenges facing researchers who study SES. Although material resources are seemingly the easiest of the three forms of capital to quantify, conceptual and practical issues obstruct a uniform measure of financial assets. Critical distinctions exist between concepts such as labor market earnings, hourly wage rate, monthly rent, and wealth—including liquid and other forms of income. Questions about single versus multiple indicators introduce a tug-of-war between specificity and power. Additionally, the study of financial resource is entangled in issues of privacy and shame such that practical concerns about obtaining honest and accurate responses often drive the selection of indicators.

Beyond the question of which indicators to choose lies the puzzle of whose capital to measure. Particularly for children, there is a question of whose assets best reflect their own access to resources. Moreover, the traditional view of SES as an individual characteristic has been usurped by the notion that multiple levels of SES bear relevance for developmental outcomes. Family per capita income, calculated by dividing the sum of income from all sources coming into the household over a certain period of time by the number of people living in the home, presently holds favor over individual income. Also, researchers now concern themselves with the measurement of neighborhood and school level capital.

Institutional resources, norms/collective efficacy, and relationships, according to Leventhal and Brooks-Gunn, are three forms of capital used to characterize neighborhood SES. Institutional resources capture material benefits of neighborhood residence, such as schools, health care services, employment opportunities, and child care. Norms/collective efficacy includes shared values, group behavior, and regulatory mechanisms that serve to monitor community activity. And relationships, much like social capital, comprise the support networks, home environments, and the relationships of community members. Neighborhood SES accounts for variance in developmental outcomes beyond that explained by individual or household SES (Leventhal & Brooks-Gunn, 2003). Yet the challenges involved in measuring a community's SES are equal to if not greater than those of selecting indicators for a single person or home.

Neighborhood of residence, family structure, and employment are increasingly fluid constructs. Poor families, especially, face uncertainty and change in their access to financial and other forms of capital. The dynamic nature of socioeconomic conditions means that snapshots of family functioning at a single point in time may misrepresent the effects of SES on human development. Researchers now prefer to pull for annual income rather than tapping hourly wages or monthly earnings, and most consider multiyear measures superior still. Questions about "usual" income, on the other hand, are vulnerable to inaccuracy and might best be avoided.

The persistence of one's socioeconomic position warrants attention, particularly given evidence suggesting that cumulative effects of income volatility over time may have greater influence on the adjustment of economically disadvantaged children than average income levels (McLoyd & Smith, 2002). Furthermore, developmental outcomes may depend on the life course timing of socioeconomic conditions. Whereas early childhood supports the strongest relations between family income and cognitive ability (Duncan & Brooks-Gunn, 1997), the teenage years play host to an increased relation between neighborhood SES and behavioral outcomes (Leventhal & Brooks-Gunn, 2000). Moreover, the effects of gradations in socioeconomic conditions are nonlinear (Duncan and Magnuson, 2003), and changes in SES over time may matter more for those who have less. These issues justify a growing focus among developmentalists on longitudinal studies of SES.

Despite unresolved problems of representation and measurement, the correlations between SES and important developmental outcomes are strong. SES positively predicts child birth weight, school achievement, behavior, socioemotional development, and pubertal timing (Entwisle & Astone, 1994) as well as adult physical and mental health and life expectancy (Blacksher, 2002). Concomitantly, the advantage of analyzing SES holistically rather than as separate

indices is questionable. Income, education, and occupation, for example, all relate to physical health, yet, according to Liberatos, Link, and Kelsey (1988), are not themselves highly intercorrelated. Indeed, each indicator is often associated with health outcomes independent of the other two. Currently the favored method among researchers is to measure multiple components of SES but enter them separately in analyses (Ensminger & Fothergill, 2003).

The trend away from aggregation and simplification and toward greater specificity and sophistication characterizes the current state of research on SES and human development. SES earns the reputation of a catch-all variable because indices of income, education, and occupation typically stand as markers for all of the cognitive and socioemotional traits that contribute to a certain level of SES (Jeynes, 2002). With few experimental studies manipulating socioeconomic conditions, the causal effects of SES indicators are often difficult to determine.

Studying moderators and mediators of SES in its relation to developmental outcomes may map pathways through which socioeconomic conditions influence human development, yet this endeavor is in its early stages. Many hold parenting practices as key mediators of SES-developmental relations, but the study of this linkage currently falls short of establishing a causal pathway between parenting and child outcomes (Duncan & Magnuson, 2003). An alternative though not contradictory conception is that parenting practices may moderate the effects of SES. Similarly, although economic models hold that families with greater financial capital are better able to purchase or produce inputs important to child development, specific routes of influence remain elusive due to selection effects and third variable problems.

Selection effects refer to the phenomenon whereby individuals with characteristics in common select similar environments—in this case, socioeconomic conditions. The idea is that such shared characteristics represent a third variable that may explain environmental relations to development. Genes stand as the ultimate third variable, and deterministic accounts posit that all socialization can be reduced to the actions of genes on behaviors (Rowe, 1994). Yet quasi-experimental manipulations of income show benefits of financial gain for child development (Costello, Compton, Keeler, & Angold, 2003) and recent adoption studies provide compelling evidence for a causal role of socioeconomic status by revealing greater IQ gains for children adopted into families with higher SES (Duyme, Dumaret, & Tomkiewicz, 1999).

The causal contributions of SES to developmental outcomes seem likely, if not well charted. Rather than presupposing that socioeconomic indicators operate unidirectionally and in isolation, researchers today tend to view SES within a dynamic system of influence. The notion of parallel causation suggests that several different factors may be sufficient but not simultaneously necessary to produce a particular outcome. Convergent causation refers to the idea that a particular process may be necessary but not sufficient to produce a given outcome. Additionally, the principle of reciprocal causation states that a developmental outcome may depend on the bidirectional influences of multiple factors interacting across time (Bornstein & Bradley, 2003). Each of these ideas deserves consideration in the study of SES-developmental relations.

Growing evidence supports the notion that various components of SES influence one another (Jeynes, 2002). Occupation, for instance, influences one's relationships and therefore one's social capital, while relationships, in turn, may create employment opportunities (Bradley & Corwyn, 2002). Furthermore, ecological and living systems theories propose dynamic and bidirectional relations between contextual factors and individual characteristics. Research showing that job conditions shape workers' values, personalities, and even cognitive skills (Parcel & Menaghan, 1994) exemplifies such interplay. The complexities of dynamic influence speak at once to the fluidity of status, as well as to the pervasiveness of inequality and challenge of individual escape. Indeed, this latter idea resonates with theories of social class and calls into question the validity of core assumptions of the SES model.

The relationship between SES and age, gender, and race/ethnicity (among other person variables) remains a frontier for research. To avoid oversimplification, developmentalists typically leave categories for age, gender, and race/ethnicity out of indices of SES, choosing instead to analyze these variables separately (see Oakes & Rossi, 2003). Yet such person variables may be part and parcel of socioeconomic position in ways that are not easily captured by indices of financial, human, and social capital.

One issue is the influence of age, gender, and race/ethnicity on socioeconomic attainment. Much concern surrounds gender and racial and ethnic gaps

in socioeconomic indicators such as educational achievement (for children) and wages (for adults). Current interest centers on separating effects of oppression and institutional barriers from those of gender or cultural orientations toward status indicators. A somewhat separate issue is that our current models fall short of accounting for status inconsistencies associated with age, gender, and race/ethnicity such as the greater respect afforded a white mill worker than a black teacher (Stuckey, 1990).

Also, growing evidence supports person variables such as age, gender, and race/ethnicity as moderators of SES-developmental relations. Although socioeconomic conditions predict mental health problems, for instance, after controlling for SES, African Americans, Native Americans, and Hispanics are less likely to report or to be reported as having such problems (Saaman, 2000). Findings such as this call into question the cultural sensitivity of our models of SES. Indeed, certain SES constructs such as marital status may have little bearing (Ackerman, Schoff D'Eramo, Umylny, Schultz, & Izard, 2001) for cultural groups such as African Americans where unmarried cohabitation arrangements are the norm (McLoyd, 1998) and our models may lack indices to capture the capital available through certain cultural connections and perspectives.

The potential insensitivity of our models to age, gender, and racial/ethnic differences in the meaning and relevance of status indicators is at once perplexing and not surprising. Although the study of SES and human development aims to understand complexities of status, we are at the same time products of our socioeconomic system, and the difficulty of gaining objective perspective on that system cannot be overestimated. This is perhaps the best explanation that can be offered for why our study of SES has been limited until recently to a deficit model where heterogeneous socioeconomic groups provide data on middle-SES constructs. Indeed, when the assumed functionality of stratification underlies our concept of SES, it is hard to escape a circular justification of socioeconomic position.

Within this traditional frame, it should come as little surprise that low-SES individuals appear deficient. Undeniably, social address powerfully predicts problematic developmental outcomes. Yet a deficit model falls short of illuminating how low SES translates to maladjustment, why low-SES individuals show different types of problematic outcomes, or what allows some low-SES children to dodge the risks and maintain functional behavior and health. Indeed, recent studies suggest that contextual elements that correlate with financial capital across socioeconomic strata vary independently within lower-SES brackets and may exert independent influence on child development (Ackerman, Brown, & Izard, 2003, 2004; Duncan & Brooks-Gunn, 1997, 2000). Only by abandoning a deficit model and creating an alternative frame can we tackle the theoretical and empirical issues that are critical to a complex understanding of socioeconomic risk.

Growing awareness of the issues, tightening designs and measurements, and increasingly powerful statistical techniques all drive advances in the study of SES. Yet, as our models gain sophistication, the importance of socioeconomic conditions persists. The strong relations that SES shares with cognitive, health, and socioemotional outcomes supports its use as a primary variable of interest and as a control in developmental research. So long as we live in a stratified society, the study of socioeconomic status is likely to remain critical to an understanding of human development.

—Eleanor D. Brown

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SPANKING

Definitions of spanking or corporal punishment vary widely depending on the source. Much of this variation can be attributed to differences in individual agendas. For example, Murray Straus, on record as being opposed to striking children in any form, classed it as "minor violence," clearly a pejorative term. He then goes on to define corporal punishment as "a legally permissible violent act, carried out as part of the parenting role." James Dobson, on the other hand, writes that a lovingly administered spanking is an essential part of teaching children healthy boundaries.

Public perceptions vary just as widely. Although a large majority of American parents use spanking as part of their repertoire of disciplinary techniques, and 80% to 90% of adolescents report having been spanked as a child, only about half report having been "physically disciplined." Furthermore, only a small percentage of these adolescents reported feeling abused by their parents. Clearly there is a dichotomy between what parents and adolescents report and what some experts are saying about physical punishment.

Spanking is an issue that raises strong emotions. Not that long ago, spanking—striking a child on the buttocks with the flat of the hand or an implement such as a belt—was considered a necessary part of responsible parenting. As rates of violence and abuse in American society continue to grow, developmental researchers have come to the conclusion, not always supported by research, that hitting children under the guise of punishment is contributing to this rise in violence. These researchers have called for restrictions on parents that range from "rules" about how to spank a child to laws like those in Sweden and other countries that outlaw spanking completely. Yet, an issue this complex cannot be resolved that simply.

Anecdotally, many American adults will tell you that they can "just tell" which children have been spanked at home and which have not, with the implication being that those who are not spanked are "spoiled brats." Researchers tell us that those children who are spanked tend to be more aggressive and have poorer mental health. The truth very probably lies somewhere in the middle. Elizabeth Gershoff's 2002 meta-analysis (a statistical procedure in which the results of 88 different studies were combined) concluded that physical punishment is detrimental, but Diana Baumrind noted in her commentary on Gershoff that much of the research on spanking fails to adequately discriminate between spanking administered in the context of a healthy parent-child relationship and spanking in an abusive relationship. Baumrind and other authors, including Nancy Darling and Laurence Steinberg, and Joan Grusec and Jacqueline Goodnow, note that the context of a spanking, the child's interpretations of the reasons for it, and the attitudes formed by the spanking are perhaps more important that the spanking itself. Parents who use a variety of disciplinary methods, who are not prone to screaming or yelling, and who talk to their children and lay out clear expectations are very likely to see different outcomes from a spanking than parents who use harsh spanking as a first resort. Yet if researchers merely ask, "Do you spank your child?" these distinctions are soon lost.

Other research has examined the effectiveness of spanking as a disciplinary method. Generally, children who are spanked show more immediate compliance to adult demands, but studies also show that they are less likely to internalize morals. This is most likely linked to a lack of explanations for why specific behaviors are wrong and what the appropriate correct behavior would have been. Otherwise, spanking has few demonstrated positive effects and has not been shown to be preferable to other forms of discipline that may be more effective at maintaining the parent-child relationship, protecting the child's self-esteem, and allowing the child to understand the reasons for parental directives.

Clearly, a need exists for better-controlled studies on spanking within the context of healthy parent-child relationships, on long-term outcomes of children who are spanked, and on the effectiveness of spanking as a disciplinary technique.

—Susan L. O'Donnell and Gregory Lonigan

See also Punishment

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SPECIAL NEEDS CHILDREN

Special needs children, or students with exceptionalities, describes all students who require special education and related services in order to develop their full potential. This definition further suggests that students receiving special education represent a subset of the general population of students and that they exhibit interindividual variation (i.e., developmental differences from one child to the next). Students with exceptionalities are a heterogeneous, or diverse, group and they require special education because they are markedly different from the general population of students in one or more areas because of their disability or limitation, or, in the case of gifted children, because of their special gifts and talents. The federally funded categories of disabilities include specific learning disabilities, speech or language impairments, mental retardation, serious emotional disturbance, hearing, orthopedic, or visual impairments, multiple disabilities, deaf-blindness, autism and traumatic brain injury, developmental delay, and preschool disabled. Furthermore, disabilities may vary greatly in cause, degree of severity, and effect on educational progress, and the effects, in turn, may vary

depending on the individual's age, gender, and life circumstances.

On the national level, nearly 15% of all preschool and school-aged children qualify as having a disability. In the 1999 to 2000 school year, almost 5.75 million students, between 5 and 21 years of age, received some kind of special education, and this number has been steadily growing. With regard to gender, more than two-thirds of all students receiving special education are male, with boys outnumbering girls in two categories: learning disabilities and emotional disturbance. The two most prevalent categories of disabilities are specific learning disabilities (50.5%) and speech and language impairments (19.1%), followed by mental retardation (10.8%) and emotional disturbance (8.2%). The fastest growing category is that of learning disabilities. The number of children with attention deficit disorder and attention deficit/hyperactivity disorder (ADHD) has also increased dramatically since 1992, which may be largely attributed to a federal memorandum stipulating that these children were eligible for services under other-health impaired category.

In addition to federally funded categories, another category of exceptionality, gifted and talented, is also used to describe children with special needs who require special education services. Prevalence rates of children identified as gifted and talented vary greatly by state as a function of a particular definition, ranging from a conservative 2% of all students when high IQ and achievement test scores cut-offs are used, to a more liberal 10% to 15% when a flexible, multiple-criteria approach is used. Additionally, researchers have devoted increasing attention to describing characteristics and needs of twice-exceptional students, or students who have both gifts and disabilities and/or learning disabilities, including hearing-disabled gifted students, high potential students with cerebral palsy, and academically gifted students with ADHD and/or learning disabilities, the latter being the most prevalent and widely studied category of twice-exceptional learners. As is the case with students with learning disabilities as well as gifted students, prevalence rates of gifted learning-disabled students is a function of a particular definition, with rather conservative estimates ranging from 2% to 5% of the total population of children with disabilities. Currently, there is a heated debate among the proponents of gifted education concerning how to best identify and serve gifted and talented children.

Generally, students may receive special education/gifted and talented services if they meet a certain set of cut-off criteria. However, if the student with exceptionalities fails to meet these criteria, this student is often left to struggle in school without much support and, thus, potential may be lost. Teachers need training in how to address the needs of children with exceptionalities. Because manifestations of exceptionalities may change as the child matures, educators and service providers are encouraged to take a developmental perspective of students with special needs. In sum, it is generally agreed that in identifying and serving the needs of children with special needs, the emphasis should be on recognizing abilities rather than focusing on disabilities.

—Lilia M. Ruban and F. Richard Olenchak

See also Americans with Disabilities Act, Inclusion/Mainstreaming, Individualized Education Programs (IEP), Individuals with Disabilities Education Act (IDEA), School

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STAGES OF DEVELOPMENT

The concept of developmental stages has been applied widely in the literature on human development. Many theorists believe that individuals progress through various stages as they develop into fully functioning human beings. The types, length, and characteristics of stages vary depending on the theory one reads. This entry will briefly

define the concept of developmental stages and discuss the characteristics of three widely cited theorists in this area: Sigmund Freud, Jean Piaget, and Erik Erikson.

DEFINITION OF A DEVELOPMENTAL STAGE

Many theories of human development are based on the idea that individuals progress to adulthood through a series of identifiable stages. In general, the term *stage* refers to the period of time in one's development in which biological, psychological, and social forces interact to promote the growth of the individual. Individual stages can be conceptualized as dynamic rather than static and are related to other stages in a sequential manner. Theoretically, a series of stages comprises a pathway that individuals need to progress through in order for development to be actualized. In addition, each stage progressively builds on the stage(s) immediately preceding it, and some contend that earlier stages may be revisited later in life.

Table 1 Comparison of Freud, Piaget, and Erikson's Developmental Stages

Developmental Stage	*Freud*	*Piaget*	*Erikson*
1	Oral (0–1)	Sensorimotor (0–2)	Basic trust vs. basic mistrust (0–2)
2	Anal (1–3)	Preoperational (2–7)	Autonomy vs. shame and doubt (2–3)
3	Phallic (3–5)	Concrete operational (7–12)	Initiative vs. guilt (3–5)
4	Latency (5–12)	Formal operational (12 and older)	Industry vs. inferiority (5–12)
5	Genital (12 & above)	—	Identity vs. role confusion (12–18)
6	—	—	Intimacy vs. isolation (18–30)
7	—	—	Generativity vs. stagnation (30–65)
8	—	—	Ego integrity vs. despair (65 and above)

NOTE: Numbers in parentheses are approximate ages for the stage.

CHARACTERISTICS OF STAGES

The characteristics of specific stages (e.g., type, length) vary according to the specific theory of human development. Some theorists have proposed a sequence of stages that primarily focus on the child and adolescent, while others consider development across the life span. One of the earliest and most influential theories of development was described by Sigmund Freud. He believed that individuals are influenced by unconscious forces inside the person (i.e., id, ego, superego) and are largely motivated by sexual (i.e., libido) and aggressive drives. His theory of development is based on a psychosexual perspective and largely focuses on the first 12 years of an individual's life. In fact, Freud believed that an individual's personality was largely determined by the developmental process that takes place early in one's life. In addition, the specific stages he described (Table 1) are named from the areas of the body the libido is most centered on during that point of development.

Jean Piaget is another influential theorist who focused on the cognitive development of the individual. He believed that a significant amount of cognitive development (thinking processes) takes place during the first 12 years of life. Specifically, he suggested that a child's development of cognitive skills (Table 1) progresses over time beginning with the sensorimotor stage (ages 0–2) and ending with the ability to engage in abstract reasoning during the formal operational stage (ages 12 and older). The name of each stage reflects the type of cognitive development taking place for the child at that particular time in his or her life.

In contrast to Freud and Piaget, Erik Erikson's psychosocial theory considers human development across

the life span. Erikson believed that development is an interactional process between the biology of the individual and the environment. He described a series of eight psychosocial stages through which an individual progresses from birth to geriatrics (Table 1). At each of Erikson's stages, individuals are faced with a specific challenge or struggle termed a crisis. The successful resolution of a crisis allows the individual to acquire the necessary skills for that particular stage and to continue progressing to the following stage. In addition, Erikson asserted that individuals are faced with challenges throughout the life span continuing into older age (e.g., integrity vs. despair).

SUMMARY

The concept of stages has long been used, by various theorists, to explain the process of human development. Freud, Piaget, and Erikson are three of the major theorists who have each described a series of stages that individuals progress through on their way to becoming fully functioning individuals. More specifically, Freud and Piaget focused their developmental theories on the first 12 years of life while Erikson extended his theory to include the entire life span. Each of these theorists provides a divergent yet unique way to understand human development from a psychosexual, cognitive, and psychosocial perspective.

—Jason J. Burrow-Sanchez and Robert March

See also Adolescence, Development, Early Childhood, Embryo, Emerging Adulthood, Fetus, Infancy, Middle Adulthood, Nature–Nurture, Older Adulthood, Oldest Old Age, Preschool Years

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STAGES OF DYING

WHEN DOES DYING BEGIN AND END?

Before one can consider whether there are stages of dying, one needs to determine when dying begins and ends. Theoretically, dying begins when bodily functions start an irreversible decline toward total cessation of all bodily functions and final death. A more practical working definition might be that dying begins when medical experts have obtained and analyzed sufficient information to judge with a high degree of probability that a patient is terminal. In this case, the judgment of physicians or medical experts determines when dying begins. Determining the beginning of dying is important because it may influence the kind of treatment or care proposed, and patients' readiness to accept it.

From the viewpoint of patients, dying may begin when physicians communicate their judgment to patients (or when patients accept it, which may not occur immediately).

The end of dying is also difficult to determine. Theoretically, dying ends when there is total cessation of all bodily functions and the body begins the first stages in decaying. On a practical level, this is not an easy point to determine. Death is not an event such that one is alive one second and dead the next. Under natural conditions, "deathing" is a process where one becomes dead in a series of steps. Bodily functions end at different rates of speed depending on how long a particular part of the body can function without oxygen. Thus, a pronouncement of death and final death (total cessation of all bodily functions) are not the same.

However, practical considerations in modern society (e.g., decisions on inheritance, organ transplants, solving homicides) call for a pronouncement of death at the earliest possible moment in the deathing process when one can assume that the subsequent steps will inevitably follow. The pronouncement of death is relative to the scientific and cultural criteria used at a given period in time, which will continue to evolve in the future.

It is also important to consider the duration of the interval between the beginning and end of dying. For some, the duration of dying may be a few years, and for others it may be only a few hours. When people are dying, they are still alive, and one must consider their needs and concerns as both living and dying individuals. When individuals are dying gradually, they are "living while dying" and still must face many of the problems of everyday life. If they have only hours to live, then they are "dying while living," where the focus is more on just surviving from moment to moment.

Should Individuals Be Told They Are Dying?

Many people feel that patients should definitely be told that they are dying. Under the Federal Patient Self Determination Act of 1991, hospitals must inform patients of their condition because patients have the right to make decisions about their subsequent medical treatment. However, the custom of some subgroups in our multicultural society (e.g., Asians and Hispanics) is that the physician should tell the family but not the patient. Beyond this, some people feel that if patients are told they are dying, they may be unable to face the news, lose all hope, or develop anxiety and depression that will only accelerate the decline.

Types of Awareness Contexts

In a classic study, Glaser and Strauss identified four types of awareness contexts in the communication system between the dying patient and medical staff in institutions. The first is called closed awareness, where the staff knows but avoids letting patients know that they are going to die. The second type is called suspected awareness, where patients suspect that they are going to die and attempt to seek confirmation of their doubts (e.g., by learning about their condition, monitoring changes in treatment and any failure to respond to treatment, observing the behavior of others, and observing others with similar conditions). The third type is called mutual pretense, where both patients and staff know the patient is dying but both pretend not to know. The fourth type is open awareness, where both patients and staff know, and there is open discussion about dying.

PHYSICAL HEALTH CHANGES IN THE DYING PROCESS

Throughout the dying process, there are changes in health status, energy level, fatigue, frailty, mobility, weaknesses, and pain, and emergence of more specific symptoms. The latter may be due partially to the disease itself, the side effects of the treatment, and deficiencies of eating, sleeping, and activity. In active dying during the last few days of life, most patients have a reduced level of consciousness, loss of appetite, decreased thirst, disorientation (with or without visual and auditory hallucinations), restlessness, irregular breathing patterns, excessive pulmonary secretions, decreased urine production and incontinence, and progressively cool, purple extremities. Most people do not have a clear grasp of the physical decline that may occur while they are dying.

Trajectories

Based on a diagnosis and prognosis of a particular condition, a trajectory is an expectation of the duration and course of the dying process, that is, whether dying will proceed slowly or rapidly, vacillate, maintain a certain plateau, and so on. Having some idea of the trajectory can help the medical staff plan terminal care and help patients plan their lives.

PSYCHO-EMOTIONAL-SOCIAL ASPECTS OF DYING: STAGE THEORIES

Stage theories of dying are concerned with the psycho-emotional-social aspects of dying, beginning with the patient's first knowledge that he or she is dying. Unfortunately, no theory is sufficiently complete or adequate in describing and explaining all that is involved in dying. Nevertheless, these theories do provide some insights into the dying process.

Kübler-Ross's Stages of Dying

Based on interviews with dying cancer patients, Kübler-Ross identified five different emotional stages or reactions to the dying process. First, individuals go into denial when becoming aware of dying; denial helps keep anxiety under control and buys time while they try to verify the diagnosis or search for answers. Once the diagnosis is accepted, the second stage of anger begins, manifested in aggressive and demanding behavior as patients ask, "Why me?" Once the anger subsides, patients enter the bargaining stage, trying to make a deal with God or fate to exchange something to postpone the inevitable. Eventually, as patients become sicker, depression sets in—a sadness that life is coming to an end. Patients may cope by

beginning to separate themselves from others. Finally, the acceptance of death occurs, which is simply peace and hope for what is to come.

Various criticisms of this stage theory exist. Individuals may not exhibit all stages or follow any fixed sequence of stages; they may experience certain stages simultaneously, shift back and forth, and so on. Most important, many other aspects of the dying process are not captured in the five stages of emotional responses. The lasting importance of Kübler-Ross's contribution is to show that a variety of feelings are going on during the dying process, and patients do want to talk about them.

Pattison's Phases of Dying

Pattison viewed the dying process in terms of three phases rather than stages. (These phases are broader than stages and are related to the amount of anxiety that exists.) The first phase, an acute crisis period when anxiety increases to a peak point, is initiated when patients become aware of impending death. Dying individuals need to reevaluate their self-identity, reformulate meaningful goals, and make approaching death more acceptable. As they adjust to being gravely ill, the anxiety gradually diminishes, and patients enter a chronic living-dying phase, where they must face not only the problems of dying but also the problems of living (such as maintaining a job, family relationships, and so on). Many specific fears emerge (e.g., fears of bodily deterioration, loss of control, pain and suffering, loneliness, financial insecurity, and so on). Finally, patients enter the terminal phase and begin to withdraw from people, objects, and events. Hope fades and patients accept the reality of imminent death.

Individuality in Dying

Although stage theories of dying provide insights into the dying process, they assume that individuals go through a common process of dying, that is, that there is only one path rather than multiple paths to dying. The predominant view today is that there is no common or universal set of stages that people go through in dying. Individual differences are important, and the dying process depends on many factors, such as the nature of the disease and treatment (and possible side effects), the environment of the hospital or institution, the patient's personality, the quality of interpersonal relationships, ethnicity, and gender differences.

Some research exists describing the help that patients themselves want while going through the dying process, including reduction or elimination of pain and symptoms, control of treatment and care, maintaining a relationship with loved ones without becoming a burden, maintaining their energy level and cognitive capacities as much as possible, and maintaining degrees of hope. All these factors and many others need to be integrated with existing knowledge about the dying process to gain a fuller picture of how patients' psycho-emotional-social states may vary at different "stages" of the dying process.

—Victor G. Cicirelli

See also Death, Death with Dignity, Dying

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STAGES OF MORAL DEVELOPMENT

Josie's mother asked her to run into the convenience store to pay for their gasoline. She handed her 10-year-old daughter a $20 bill. When Josie reached the checkout counter, the cashier said, "That will be $14.85, please." Josie handed the clerk the $20.00. After the clerk gave Josie her change, she began looking around the store at all the candy and soda pop. Suddenly, Josie looked down into her hands to see how much money was left over and realized that the clerk had given her too much change; he gave her a ten dollar bill instead of a $5 bill! She could buy

$5.00 worth of candy and her mother would never know. What should Josie do—return the change or buy some extra treats?

All individuals will encounter moral dilemmas such as the one described above. How does each of us handle these situations and why do we differ in our responses? According to *Webster's Dictionary,* morality refers to "the quality of being in accord with standards of good or right conduct." Individual variability in perceptions of what is "good" or "right" behavior exists. In addition, behavioral responses to moral dilemmas differ among people.

The study of moral development has been ongoing for a number of years and has become more popular within the past decade. With increases in societal problems such as violence in our schools and heavy drug use among children and youth, the topic of moral development is currently being treated as a critical one in the field of psychology (Damon, 1999). Most of the psychological research in this area has focused around the work of Lawrence Kohlberg, a primary theorist in moral development.

KOHLBERG'S THEORY

Using Piaget's (1932) theory of moral judgment for children, Lawrence Kohlberg (1958) developed a comprehensive stage theory of moral development. This theory is cognitive in nature, focusing on the thinking process that occurs when one decides whether a behavior is right or wrong. Thus, Kohlberg's theoretical emphasis is on how one decides to respond to a moral dilemma, not what one decides or what one actually does. For instance, a young child and an adult may both decide to return extra change to a cashier, but the reasons they give for that decision may be entirely different.

Kohlberg's theoretical framework consists of six stages arranged sequentially in successive tiers of complexity. He organized his six stages into three general levels of moral development.

Level 1: Preconventional Level

At the preconventional level, morality is externally controlled. Rules imposed by authority figures are conformed to in order to avoid punishment or receive rewards. This perspective involves the idea, What is right is what one can get away with or what is personally satisfying.

Stage 1: Punishment/ Obedience Orientation

Behavior is determined by consequences. The individual will obey in order to avoid punishment. For instance, Josie (the character in the introductory hypothetical story) may choose to return the extra change out of fear that her mother may punish her if she keeps it. On the other hand, Josie may choose to keep the extra money because she is confident that she will not get caught and there will be no punishment.

Stage 2: Instrumental Purpose Orientation

Behavior is determined again by consequences. The individual focuses on receiving rewards or satisfying personal needs. For example, Josie may choose not to return the extra money because she can buy candy and soda pop for herself. Or Josie may choose to return the money because she thinks the cashier will give her a monetary reward for being honest.

Level 2: Conventional Level

At the conventional level, conformity to social rules remains important to the individual. However, the emphasis shifts from self-interest to relationships with other people and social systems. The individual strives to support rules that are set forth by others such as parents, peers, and the government in order to win their approval or to maintain social order.

Stage 3: Good Boy/ Nice Girl Orientation

Behavior is determined by social approval. The individual wants to maintain or win the affection and approval of others by being a "good person." Josie may return the extra money because her mother will be so proud of her. Conversely, Josie may choose not to return the extra change because her friends will think she's "cool" because she got away with it.

Stage 4: Law and Order Orientation

Social rules and laws determine behavior. The individual now takes into consideration a larger perspective, that of societal laws. Moral decision making

becomes more than consideration of close ties to others. The individual believes that rules and laws maintain social order that is worth preserving. For example, Josie may choose to return the extra change to the cashier because she knows that keeping the money would be breaking the law.

Level 3: Postconventional or Principled Level

At the postconventional level, the individual moves beyond the perspective of his or her own society. Morality is defined in terms of abstract principles and values that apply to all situations and societies. The individual attempts to take the perspective of all individuals.

Stage 5: Social Contract Orientation

Individual rights determine behavior. The individual views laws and rules as flexible tools for improving human purposes. That is, given the right situation, there are exceptions to rules. When laws are not consistent with individual rights and the interests of the majority, it does not bring about good for people and alternatives should be considered. For instance, Josie may return the extra change because she knows it would not be fair to the cashier because his cash drawer will come up short at the end of the day.

Stage 6: Universal Ethical Principle Orientation

According to Kohlberg, this is the highest stage of functioning. However, he claimed that some individuals will never reach this level. At this stage, the appropriate action is determined by one's self-chosen ethical principles of conscience. These principles are abstract and universal in application. This type of reasoning involves taking the perspective of every person or group that could potentially be affected by the decision. In regards to Josie, her decision not to keep the extra change would be based on taking into consideration how her dishonesty would affect the cashier, the store owner, other customers, her mother, and possibly other family members.

BASIC TENETS OF KOHLBERG'S THEORY

The numerous studies investigating moral reasoning based on Kohlberg's theory have confirmed basic tenets regarding the topic area. Cross-sectional data have shown that older individuals tend to use higher stages of moral reasoning when compared with younger individuals (Kohlberg, 1969), while longitudinal studies report "upward" progression, in accordance with Kohlberg's theoretical order of stages (Kohlberg, 1978). In addition, comprehension studies have revealed that comprehension of the stages is cumulative (e.g., if a person understands stage 3, he or she understands the lower stages but not necessarily the higher stages), and comprehension of higher stages is increasingly difficult (Rest, 1973). Moreover, age trends in moral development have received cross-cultural support (Snarey, Reimer, & Kohlberg, 1984). Lastly, data support the claim that every individual progresses through the same sequence of development; however, the rates of development will vary.

MEASUREMENT OF MORAL DEVELOPMENT

Since the development of Kohlberg's theory, a number of measurement tools that purport to measure moral reasoning have been constructed. The Moral Judgment Interview (Kohlberg, 1969) is a rather lengthy structured interview requiring trained interviewers and scorers. Other instruments include the Defining Issues Test (Rest, 1979) and the Measure of Conscience (Hoffman, 1970). These measures, ranging from projective tests to structured, objective assessments, all consist of a set of hypothetical stories involving moral dilemmas.

CONCLUSION

Moral development plays an important role in our social interactions. Understanding how and why individuals make decisions regarding moral dilemmas can be very useful in many settings. Kohlberg's theory of moral development provides a framework in which to investigate and begin to comprehend how moral reasoning develops within individuals.

—Cheryl E. Sanders

See also Kohlberg, Lawrence; Moral Development

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STANDARDIZED TESTING

The term *standardized testing* is often used as synonymous with the kind of multiple-choice, large-scale group testing that takes place in schools and that is aimed at assessing academic achievement. This meaning of the term originated in educational settings as a way of distinguishing printed, commercially available instruments—such as the Stanford Achievement Test or the Iowa Test of Basic Skills (ITBS)—from nonstandardized, teacher-made classroom tests. However, while it is true that such testing is standardized, many other types of cognitive ability tests, as well as personality assessment instruments, can also qualify as standardized.

When educational or psychological tests or assessment instruments are described as "standardized," that description refers to two distinct, yet interrelated, aspects of the instruments. The first aspect of standardization consists of uniformity in the administration and scoring procedures of a test. In this sense, a test is standardized if it is administered and scored according to preestablished, carefully delineated guidelines that are to be followed whenever the instrument is used—regardless of the setting in which it is used or the particular individual or group with whom it is used—in an effort to maintain fairness and objectivity. Details such as the directions to be given to examinees, the time limits for a test, the materials to be used, and the way test takers' questions should be addressed must be specified by the test author in the documentation that accompanies a test. The emphasis on strict control of the procedures under which the behavior samples that make up educational and psychological tests are gathered and recorded is a legacy dating back to the earliest period of experimental psychology as it developed in 19th-century Germany. At that time, experimenters became keenly aware that such things as the directions given to research participants and the conditions of the environment in which experiments took place could affect results. Thus, standardization of procedures has been a hallmark of psychological testing from its inception and constitutes an important part of the process of test development.

The second aspect of standardization in test development refers to the process wherein data based on the performance of samples of individuals are collected—under standardized conditions—and tabulated, for the purpose of setting a standard by which the performance of subsequent test takers can be evaluated. These data, in the form of score distributions, means, and standard deviations, are the norms of a test and they constitute the primary basis for norm-referenced test score interpretation; the groups from whom they are obtained are called the normative or standardization samples. In order to provide a meaningful standard of comparison, standardization samples should be representative of the kinds of test takers for whom a test is intended. Norm-referenced test score interpretation typically involves transforming the raw scores obtained by examinees into standard scores that reflect the percentile rank position of the examinee's score within the distribution of scores of an appropriate standardization group. Thus, for example, a standard score equivalent to the 75th percentile indicates that the examinee's level of performance on the test equaled or exceeded the performance of 75% of the individuals in the standardization sample against which the person's score is being compared.

One of the problems inherent in norm-referenced test interpretation is that the normative frame of reference by its very nature is a relative viewpoint from which to evaluate performance and is wholly dependent on the characteristics of the standardization sample. Criterion-referenced or performance-based testing, also known as mastery testing, provides an alternative framework for

test score interpretation that is becoming increasingly popular in educational settings. This framework uses preestablished standards of performance at various levels of mastery against which the performance of examinees can be evaluated in order to determine their location within the standards-based continuum of ability, knowledge, or skills that the test encompasses. In recent years, publishers of the major standardized tests used in educational settings, such as the SAT and the ITBS, have begun to incorporate both norm-referenced and criterion-referenced procedures, as well as open-ended items, into their test development in order to provide more flexibility in the way scores are used and a greater range in the behaviors they sample.

—*Susana Urbina*

See also SAT

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STATISTICAL SIGNIFICANCE

In research studies, a difference on a measure compared between groups or treatment conditions could occur by chance, or it could occur because of actual group or treatment differences. In order to quantify these possibilities, researchers use tests for statistical significance. These tests are called *inferential statistics* because they allow the researcher to draw conclusions about whether results are likely or unlikely to be due to chance. For example, suppose a researcher discovers that children who study while hearing classical music outperform children who study while hearing white noise. The researcher must test whether the difference between groups is statistically significant.

There are many different types of statistical analyses and their appropriateness must be determined based on the type of data collected and the data analysis questions that are asked. In general, an inferential statistical test results in a test statistic, and the magnitude of that test statistic is associated with a probability of that result occurring by chance. The probability (p) of the result happening by chance ranges from 0.0 to 1.0. As a rule of thumb, many researchers use a criterion level of $p < .05$ in order to evaluate significance of the result. This means that if the statistical test shows that the probability of a difference between treatments happening by chance is, for example, $p < .023$, then the researcher would conclude that there is a significant difference between treatments (because p is less than .05), but if the statistical test shows a probability of, for example, $p > .27$, then the researcher would conclude that there is not a significant difference between treatments (because p is not less than .05). This arbitrary cut-off of .05 means that there is a 5% (or 1 in 20) chance that the difference between treatment groups measured in this study occurred by chance.

Table 1 True State of the World

Researcher's Conclusion	*Treatments Do Not Have Different Effects*	*Treatments Have Different Effects*
No differences between treatments	Correctly conclude that null hypothesis cannot be rejected	Type II error: fail to reject the null hypothesis when it is false
Significant difference between treatments	Type I error: reject the null hypothesis when it is true	Correctly conclude that null hypothesis is rejected

In a simple experiment, the logic of significance testing begins with the comparison of two possible states that are opposite to each other and describe all the possible outcomes. One is called the *null hypothesis*, and it typically refers to the absence of an effect. The other is the *alternate hypothesis*, and it typically describes an effect. For example, researchers might propose to test a new method of teaching children geometry. The treatment conditions would be the standard teaching method and the new teaching method. The null hypothesis might be that there is no effect of teaching method on students' later test performance. The alternate hypothesis might be that there is an effect of teaching method on students' later test performance. The results from the study are evaluated in terms of whether the null hypothesis can be rejected. This approach comes from the attempt to discover evidence to disconfirm theories in science. If the test scores between the two groups are analyzed using

inferential statistical tests, and the difference between the groups is significant, the researcher concludes that the null hypothesis is rejected and there is a difference between the two teaching methods.

Two correct conclusions and two possible error patterns result from significance testing using the null and alternate hypotheses, as shown in Table 1.

Although statistical significance testing is widely used, some researchers have suggested that there is an overreliance on this technique. The importance of considering other aspects of statistical analyses, such as effect sizes, has been proposed. Effect size helps to indicate what portion of the variation in the results stems from the treatment. If an effect is statistically significant at the $p < .05$ level, but the effect size is very small, than the importance of the treatment effect may be questioned.

—Marie T. Balaban

See also Meta-Analysis

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STEPFAMILIES

Although sources vary slightly in their definition of stepfamilies, in general, *stepfamilies* refers to a married couple in which there is at least one stepchild in the family unit. Stepfamilies can either be simple or complex. Simple stepfamilies are stepfamilies in which only one partner in the marriage brings a child (or children) to the family. Complex stepfamilies are stepfamilies in which both partners bring a child (or children) to the family. Approximately 86% of stepfamilies are composed of biological mothers and stepfathers versus biological fathers and stepmothers. Moreover, research has found that African Americans under the age of 18 are more likely to be members of a stepfamily than their Hispanic or white peers. In fact, African Americans constitute 32.3% of all stepfamilies, while Hispanics and whites comprise 16.1% and 14.6%, respectively.

According to the 2000 U.S. Census Bureau, 120 million Americans, or approximately 54% of Americans older than age 15, were married; 41 million or approximately 18% were widowed, separated, or divorced. In 1999, *Data Digest* reported that the divorce rate in the United States was 50.6%, meaning that half of all couples that married would eventually divorce. Additionally, Norton and Miller estimate that approximately 70% of divorced individuals will eventually remarry, resulting in an estimated 35% of children born in the 1980s experiencing the divorce and remarriage of their custodial parent during their childhood or adolescent years. Subsequently, there are an increasing number of stepfamilies because a large percentage of these divorced individuals that remarry have children. In fact, it is estimated that by the year 2010, stepfamilies will be the most prevalent type of family in the United States, accounting for more than 50% of all families.

Despite the rapid growth of stepfamilies across all ethnic groups in the United States, most research concerning family units has been conducted on intact families (families consisting of both married biological parents residing in the same household) and inappropriately generalized to stepfamilies. Using this type of methodology may result in erroneous conclusions about stepfamilies because the dynamics and interactions among members in stepfamilies can be quite different from those of intact, biological families. However, research specific to stepfamilies has recently begun to emerge. A large focus of research has been on the well-being of children and adolescents from stepfamily environments in a variety of areas, including academic performance, psychological well-being, social well-being, emotional well-being, and physical well-being. There is some evidence that children raised in stepfamilies are at an increased risk for developing a host of problems compared with their peers raised in intact families. For example, Hanson, McLanahan, and Thomson found that children in stepfamilies performed poorer in school, had higher rates of externalizing and/or internalizing negative behaviors, showed less

initiative in school, and experienced a lower quality of life when compared with children from intact, biological families. The effect sizes revealed that the differences found in externalizing negative behavior were moderate differences ($\eta^2 = .09$), while the differences in quality of life were quite large ($\eta^2 = .22$). Similarly, Dunn, Deater-Deckard, Pickering, O'Conner, and Golding studied 4-year-old children growing up in stepfamilies and found that these children (and their older siblings) had more emotional problems, more peer problems, and higher levels of hyperactivity than their peers from intact, biological families. However, unlike Hanson and colleagues, Dunn and colleagues noted that the differences found between the groups for "total difficulties" was small (based on an effect size of .23).

A limitation of the aforementioned studies is that there is no indication of comparability between individuals from the intact families and the stepfamilies on variables such as age, ethnicity, gender, and income, meaning the differences found could simply be a function of those variables. Love and Murdock compared the psychological well-being of two samples of undergraduate college students from intact families and stepfamilies. To address the limitations of previous studies, Love and Murdock ensured equality between groups by matching both samples on several demographic variables such as age, gender, class rank, ethnicity, income, parental income, and parental level of education. They found that members of the stepfamily group reported significantly less psychological well-being than their peers from intact, biological families. Additionally, the study found that individuals' family environment (intact family vs. stepfamily) was a significant indicator of the level of psychological health that the individuals experience, but only explained a small portion of the variance associated with psychological well-being (5.9%). Finally, a meta-analysis by Amato and Keith reported that children from stepfamilies had poorer outcomes in numerous areas such as academic skills, psychological well-being, and social well-being compared with their peers from intact, biological families.

Numerous studies have sought to explain why individuals in stepfamilies have poorer levels of adjustment than individuals from intact, biological families, but definitive answers have yet to be reached. For instance, Hanson and colleagues theorized that the increased levels of household conflict associated with stepfamily environments would account for the differences found in levels of well-being between individuals from stepfamilies and individuals from intact biological families, but their theory was not supported. Love and Murdock found that children in stepfamilies had not bonded as well to their biological parents as children from intact families. As such, Love and Murdock theorized that the less secure parent-child bonds would account for the discrepancy. However, because the researchers did not gather information about the parent-child bonds after the divorce, but prior to the remarriage, it is difficult to determine if the lack of bonding is a result of the remarriage or other factors. Love and Murdock's theory was partially supported, for they found that individuals' level of bonding with their parents partially explained some the discrepancy in adjustment outcomes, but parent-child bonds could not explain the phenomenon in its entirety. These findings suggest that there are other undetermined factors that account for the differences in adjustment for youth from stepfamilies versus those from intact, biological families.

Research is continually being conducted to delineate factors that account for the discrepancy, but the current research has some limitation that must be addressed to provide an accurate account of the experiences of individuals from stepfamilies. Several studies have directly compared individuals from intact families and stepfamilies. However, they have not excluded an important comparison group, individuals from divorced families who are not members of a stepfamily. By comparing all three groups, researchers would be able to determine if outcomes for individuals from stepfamilies are a function of the stepfamily environment, or are more related to a product of divorce.

Despite studies that have found less favorable outcomes for children and adolescents from stepfamilies, all stepfamily members do not necessarily experience negative outcomes. Many stepfamilies function as well as, if not better than, intact, biological families. Several factors have been identified that can facilitate the successful formation and existence of a stepfamily unit, including minimizing the amount of conflict between the stepparent and the noncustodial parent, and/or conflict within the stepfamily environment. Custodial parents should encourage the noncustodial parent to stay active in the child's life. A detrimental sense of abandonment may occur when children's noncustodial parents cease to be involved in their child's life, which may interfere with "healthy" life functioning. Custodial parents should strive to improve their levels of "closeness" with their children in the stepfamily. Love and Murdock found that parental bonds between children and their custodial biological parents partially explained the low levels of adjustment for individuals in stepfamilies. Therefore, working to improve parent-child relations

may improve individuals' transition into the stepfamily environment and facilitate their positive adjustment in various aspects of life. Open communication should be encouraged between all members of the stepfamily, and each member should work to develop a sense of cohesion between family members. Because issues such as discipline and money may create conflicts in stepfamily environment, the custodial parent and stepparent should clearly define roles that each parent will play in the children's lives before they become problematic. These tips are just some factors that may be useful to members of stepfamilies or for individuals who work with stepfamilies in a professional manner.

—Keisha M. Love and Tamera B. Murdock

See also Divorce

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STORM AND STRESS

G. Stanley Hall, a monumental figure in the field of child and adolescent development, described adolescence as suggestive of some ancient period of "storm and stress." Hall's recapitulation theory of human development predicted storm and stress to be the norm of adolescence, rather than an exception, because each individual has to go through the major evolutionary stages, with the period of adolescence recapitulating the time from savagery to civilization. Adolescents have to experience pubertal changes and juggle myriad tasks to overcome chaos and become stable, responsible adults. This process of breaking the old moorings to attain higher levels will inevitably incur storm and stress. However, the sky will clear up after the storm is over—for most adolescents, the outcome is optimistic.

The school of psychoanalysis also upholds this storm and stress view of adolescence. According to Freud's psychosexual developmental theory, the onset of puberty marks the beginning of the genital stage, directing the psychic energy to genitally centered sexuality. The battle between the sexual pleasure-seeking id and the morally inhibiting superego puts the ego under tremendous tensions and pressures. Adolescents' need to end their infantile sexual lives associated with their parents, and their urge to find new love objects for true affection and for relief of sexual tension, pushes them to resolve the renewed Oedipus complex. Conquering these conflicts in the process of rebirth is the source of stress and turmoil. As Anna Freud put it, the upheaval in adolescence is a reflection of internal conflict and psychic disequilibrium.

The figurative term *storm and stress* has been easily accepted by the general public and frequently reinforced in literature and media. Although popular, this view has been criticized for its biological determinism that leaves no room for cultural variations. Margaret Mead's claim that coming of age was relatively easy for Samoan girls challenged for the first time the assumption of universal storm and stress in adolescence, alerting the researchers to the impact of culture and the possibility of different developmental paths in adolescence. Mead also contended that that storm and stress in adolescence cannot be considered a biological inevitability. Instead, the adolescent's affliction results from growing up in the American society, where there are conflicting standards and pressure on the adolescent to make his or her own choices on matters of importance. Although Mead's conclusions have been questioned and her methods criticized, contemporary researchers recognize the importance of sociocultural influences.

While the classical notion of storm and stress persists as a myth, the empirical data have suggested

that adolescence is a relatively peaceful period for the majority of adolescents. To balance the negative implications associated with storm and stress such as adolescents' mood swings and rebellious behaviors, positive interpretations of these expressions have been provided. For example, adolescents' questioning the authority of adults, demanding autonomous decision making, and exploring various possibilities might very well be the results of their cognitive achievements. Jeffrey Arnett has modified the traditional storm and stress view of adolescence to incorporate both individual differences and cultural variations. Not all adolescents experience storm and stress, but storm and stress is more likely during adolescence than at other ages. Modernization and globalization tend to increase the likelihood of storm and stress. Coleman's focal theory of adolescence disagrees with the assumption in the storm and stress view that all issues come at once for an adolescent's attention and resolution so that high levels of stress are inevitable. It proposes that different themes come into the focuses of individuals at different times as they develop during adolescence.

In summary, the traditional storm and stress view of adolescence is characteristic of only a small group of adolescents, and it attributes the inevitable storm and stress to the biological mechanism only. Current researchers are developing more balanced, interdisciplinary theories that typically view adolescence as a period during which the adolescent tries to understand his or her biological, cognitive, social, and emotional changes as a function of a developing person adapting to a changing world, and to reorganize these experiences into a coherent, healthy identity.

—Ling-Yi Zhou

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STRANGE SITUATION

Professor Mary Ainsworth and her student Barbara Wittig at Johns Hopkins University devised the strange situation procedure in the 1960s to demonstrate concepts central to John Bowlby's ethological theory of attachment. Although originally designed to elicit behaviors presumed to be universal among infants under stress, the strange situation instead was found to elicit systematic differences in the behavioral strategies used by infants. Ainsworth's theoretical conceptualization of these patterns, in conjunction with later contributions by her former student Mary Main at the University of California, Berkeley, expanded Bowlby's theory of attachment dramatically.

Bowlby proposed that all ground-dwelling primates possess a biologically based attachment behavioral system that operates to alert an individual to potential dangers, threats, and stresses. Threat is often signaled by the presence of natural clues to danger such as separation from the attachment figure and unfamiliarity of surroundings. The function of the attachment system is to motivate an individual to seek protection from another specific individual when faced with threat and, consequently, increase the individual's chance of survival. In the absence of threat, the activation of the attachment system diminishes, allowing behavioral systems such as exploration to operate. Individuals form enduring emotional bonds (attachments) to other members of their species who provide these "haven of safety" functions; infants form their first attachments to their significant caregivers. The strange situation procedure activates the attachment system in a laboratory setting via the controlled presence of natural clues to danger.

STRANGE SITUATION PROTOCOL

Outlined in *Patterns of Attachment,* a 1978 book authored by Mary Ainsworth and her colleagues,

the strange situation is conducted in an unfamiliar toy-filled room by an unfamiliar experimenter (the "stranger") and involves a series of eight episodes. The first episode lasts 1 minute, whereas the remaining seven episodes last 3 minutes each. In the first episode, the stranger introduces the infant and parent to the room then quietly exits. In the second episode, the infant explores the toys on the floor, while the parent sits in a chair and thumbs through a magazine. In the third episode, the stranger enters the room, casually speaks to the mother, then plays with the infant. In the fourth episode (first separation), the parent exits the room, leaving the infant with the stranger. In the fifth episode (first reunion), the parent returns and the stranger exits quietly. In the sixth episode (second separation), the parent again exits, leaving the infant completely alone. In the seventh episode, the stranger enters the room and interacts with the infant. In the eighth and final episode (second reunion), the parent returns and the stranger again exits quietly. The protocol specifies a variety of standardized instructions to be followed by the parent and stranger during these eight episodes; for example, the parent is instructed to leave her purse next to the chair during the separations and to pick up the infant during the second reunion.

The strange situation is currently conducted with only one modification from the original protocol, based on a theoretically grounded concern. The separations are designed to generate just enough stress to activate an infant's attachment behavioral system, yet not generate so much stress that the child cannot employ a coping strategy. As a result, the separations (episodes 4 and 6) are typically curtailed after the infant has demonstrated distress for under 30 seconds. Curtailing the separations in this way helps ensure that an infant's behavior on reunion is a reflection of the quality of the infant-parent relationship rather than simply a reflection of extreme levels of distress that become increasingly difficult to quell.

Other modifications to the strange situation threaten its validity. It is critical that the procedure not be conducted in the child's home or day care classroom and that the "stranger" role not be filled by an adult whom the infant has met previously. Familiarity with the room or stranger tampers with the appropriate presentation of the natural clues to danger that ground the procedure. In addition, it is critical that the strange situation not be shortened to include only one separation. The procedure relies on the gradual build-up of stress, with the first separation leaving the child with the stranger and the second separation leaving the child alone. Many infants appear calm during the first separation but become quite distressed upon the second separation; this change in behavior influences classification. Furthermore, it is critical that the strange situation is used only with infants between the ages of 12 and 18 months. Younger children may not yet have become selectively attached to a specific caregiver or may not be capable of crawling to seek proximity to the caregiver, whereas older children are simply not stressed enough by the procedure to adequately trigger the attachment behavioral system.

INDIVIDUAL DIFFERENCES IN INFANT STRANGE SITUATION BEHAVIOR

The strange situation is videotaped and coded based on the infant's overt behaviors. Based on her original sample, Ainsworth identified three general classifications of behavioral patterns, which since have been documented in hundreds of samples worldwide. In the mid-1980s, Mary Main and her student Judith Solomon added a fourth classification that accounted for a diverse group of previously unclassifiable infants. All four of the strange situation classifications reflect the quality of an infant's relationship with a specific caregiver, and thus may be different with respect to each parent. In addition, these classifications refer to the quality, not strength, of attachment. Being attached to someone—even someone who does not provide optimal care—is critical to the survival of all infants. Except under anomalous circumstances, all infants become attached, even when caregivers are maltreating. Furthermore, quality of attachment is not reflected in the amount a child cries when the attachment system is activated. Although an infant's temperament relates to the amount of distress experienced during separation in the strange situation, it is not associated with the infant's classification. An infant's behavior during the separation is useful for placing the reunion behavior in context, but it is primarily the behavior toward the parent on reunion that provides insight into the quality of the attachment relationship.

Infants are classified as secure in the strange situation when they demonstrate the behavioral pattern considered optimally adaptive by Bowlby's theory: balancing their behaviors and attention between attachment (in the presence of threat) and exploration (in the absence of threat). Many of these

infants show a prototypical pattern of being distressed on separation, then promptly calming and returning to play upon reunion with the parent. However, some securely classified infants are highly distressed during separation and are slow to calm upon reunion, whereas others are not overtly distressed and do not seek direct comfort from the parent. However, all infants classified as secure show signs of missing the parent when separated and being pleased at the parent's return. In middle-class samples, approximately 60% of infants typically are classified as secure.

Infants are classified as resistant-ambivalent when they demonstrate behaviors and attention that is inflexibly oriented toward the parent, thus inhibiting exploration even after the threat has passed. These infants are highly distressed upon separation, yet inconsolable upon reunion. For example, many infants classified as ambivalent-resistant cling to the parent upon reunion while simultaneously squirming and pushing away. Infants are classified as avoidant when they show the opposite pattern: behaviors and attention inflexibly oriented away from the parent. These infants do not show overt signs of missing the parent on separation, then actively avoid the parent on reunion. For example, many infants classified as avoidant casually turn their backs toward the parent upon reunion while focusing intently on a toy. Even though avoidant infants appear calm, data on heart rate, stress hormones, and quality of play all reveal that these infants are as stressed as other infants.

Rather than showing a specific and coherent pattern, infants classified as disorganized/disoriented show any of an array of brief yet odd behaviors. For example, these infants may display anomalous postures, stilling, freezing, hand-to-mouth gestures, stereotypes such as constant rocking, and contradictory behavior patterns such as approaching the parent with head averted or starting to approach the parent then suddenly turning away before achieving proximity. These behaviors typically appear within the context of an otherwise organized attentional strategy (secure, resistant-ambivalent, avoidant), which collapses briefly. As a result, the disorganized classification is always assigned in conjunction with the best alternative organized strategy—the strategy thought to collapse.

CORRELATES OF STRANGE SITUATION CLASSIFICATIONS

Strange situation classifications are thought to reflect an infant's expectations of a particular parent's availability in times of stress, based on the history of their interactions. Indeed, the procedure has been validated largely by its moderate to strong associations to parental behavior in the home. An infant's security in the strange situation is predicted by the parent's sensitivity of care during the first year. Specifically, parents of secure babies identify and correctly interpret their infants' social signals such as crying, then respond to those signals promptly and appropriately. In contrast, avoidant and ambivalent-resistant patterns are associated with a variety of forms of insensitive caregiving. Parents of avoidant infants are especially likely to reject infant bids for attachment and to show discomfort with physical contact, whereas parents of ambivalent-resistant infants are especially likely to be inconsistent and unpredictable.

Whereas these organized patterns are associated with parental sensitivity or insensitivity, disorganized infant behavior is associated with parental behavior that is either maltreating or subtly frightening (e.g., quasi-dissociative). As Bowlby originally proposed, when frightened, a baby is motivated to flee from the source of alarm and toward the attachment figure. However, as Mary Main and Erik Hesse later pointed out, when the attachment figure actually is the source of alarm, the baby is placed in a behavioral paradox. The behavioral collapse observed in these human infants mirrors collapses shown by other primates experiencing the activation of conflicting behavior systems.

The strange situation has been validated across gender, temperament, and culture. In addition, the procedure has served as a source of validation for a range of additional attachment assessments in childhood and adulthood, including the widely used Adult Attachment Interview, devised by Main and colleagues. Furthermore, security in the strange situation predicts a variety of behaviors, mental representations, and mental health variables throughout childhood and, when environmental and relationship conditions remain stable, into adulthood as well. Overall, the strange situation is one of the most theoretically grounded and widely used instruments in the study of human development.

—Kirsten Blount-Matthews and Matthew J. Hertenstein

See also Ainsworth, Mary Salter; Stranger Anxiety

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STRANGER ANXIETY

Stranger anxiety—the emotional distress displayed by infants and young children due to the approach of an unfamiliar person—is a significant and adaptive developmental achievement in the child's life. The presence of stranger anxiety is rare in the first 6 months of life, common by about 8 months, and peaks around the child's first birthday. On average, girls display it slightly earlier than boys. Research indicates that stranger anxiety is universal cross-culturally among most infants and is signaled by a host of infant behaviors, including crying, gaze aversion, crawling or walking away from the stranger, hiding their faces, and self-soothing (e.g., sucking their thumb). The presence of such behaviors in response to strangers indicates that infants are capable of distinguishing between familiar and unfamiliar adults, a critical cognitive task.

Considerable individual variation exists among infants, with some infants exhibiting more stranger anxiety than others. Two factors have been linked to individual differences in stranger anxiety: temperament and attachment. Researchers have found that infants who are temperamentally "fussy" are more likely to respond more negatively to the approach of a stranger than temperamentally "easy-going" infants. In addition, researchers have found that infants who have been indexed as securely attached to their caregiver are more sociable and less wary of strangers than infants identified as insecurely attached. Infants who are securely attached tend to have caregivers who are sensitive and responsive to their infants' emotional signals, while infants who are insecurely attached tend to have caregivers who are either inconsistently sensitive and responsive to their infants' emotional signals or ignore their infants' signals altogether.

The incidence and severity of stranger anxiety are influenced by a multitude of contextual factors. Infants tend to display greater stranger anxiety (a) when the caregiver is not present, (b) when the stranger is either tall, unattractive, male, approaches quickly, or touches the infant, (c) when the infant is physically restrained (e.g., in a high chair), and (d) when the infant is in a familiar setting such as the home. The latter finding is explained by considering that infants seem to expect novel stimuli such as strangers in unfamiliar settings. When a stranger enters a familiar setting, it violates the infant's expectations. Taken as a whole, the above findings suggest that not only is stranger anxiety a function of the infant, but of how the infant perceives his or her relationship with the outside world.

Caregivers often wonder how the incidence and severity of stranger anxiety can be reduced. Infants tend to display fewer negative emotional displays if the stranger slowly approaches them and does not tower over them; if the stranger approaches them in the context of playing with them (e.g., peek-a-boo); if the stranger behaves contingently with infants' behaviors (e.g., smiling when the infant smiles); if infants are allowed time to familiarize themselves with a novel environment; if infants are allowed to crawl or walk away from the stranger rather than being restrained in a high-chair or similar apparatus; and if the caregiver is present.

In sum, stranger anxiety is an adaptive response that is a normal and healthy behavioral reaction. The incidence of stranger anxiety is influenced by several factors, including the context in which infants find themselves as well as how strangers approach them. These factors and others can be modified to modulate infant wariness toward strangers.

—Matthew J. Hertenstein and Rachel Holmes

See also Strange Situation

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STRESS

Many children experience stressful events in their lives. Stress can influence the development of psychological and medical problems, but can also have positive effects if successfully resolved. Research on stress poses many challenges, including how best to measure it and test it as a risk factor for later problems.

WHAT IS STRESS?

Stress has been conceptualized in a number of ways. Specifically, it can be conceptualized as an accumulation of major life events, or an accumulation of small, minor events (hassles). Stress can be conceptualized as a single event, such as a serious accident, or as a chronic situation, such as a physical disability or poverty. For some stressful experiences, it is unclear which conceptualization makes the most sense. Is parental divorce an event or a chronic situation?

One feature of childhood stress that distinguishes it from adult stress is that of controllability. Most stressful experiences during childhood occur independently of the child; they occur because something happens to the parents, or the parents do something or do not do something to the child. Adults have more control over their environment and are therefore more responsible, at least in part, for their life circumstances.

HOW IS STRESS MEASURED?

Stressor Checklists

The most widely used method for assessing stressors affecting children and adolescents is the self-report (or parent-report) checklist. Checklists are easy to administer, thus allowing investigators to collect data on large samples and to evaluate the relationships between stress and psychological and health outcomes. In the literature, there are at least 11 general stressor checklists for adolescents, and at least five for children. Adolescent checklists are usually designed to be self-report measures, whereas many child checklists are designed for parents to complete.

Although stressful event checklists are widely used and efficient, they have a number of limitations. For example, it is unclear if they actually assess "objectively stressful" events. The specific items on stressor checklists have typically been chosen by researchers based on their own personal opinion, general consensus about the nature of stressful experiences of children, or information generated in small focus groups.

Checklists usually do not assess the timing of events, and therefore are limited in their ability to determine whether stressors cause, or contribute to, the emergence of psychological and medical symptoms. In addition, most stressor checklists fail to distinguish between stressors that are independent of the child's behavior and those that are not. Independent events are less confounded with psychopathology, and therefore represent a cleaner picture of environmental input. In any case, a very significant problem with the research literature is that different researchers use different checklists, making it very difficult to summarize findings in the field.

Stressor Interviews

Stressor interviews were developed in part to address the problems of stressor checklists. Stressor interviews provide relatively objective ratings of the degree of threat and loss that is associated with stressful events. Older children and adolescents can be interviewed directly, whereas parents are interviewed for younger children. Interviews are used to generate a list of the various types of stressful events that have been encountered and the context of these events. Questions for each experienced event include a description of what happened, when it happened, who was involved, and the objective consequences of the event. External raters use a detailed scoring manual to evaluate the level of threat and loss associated with each event and situation, or the severity of impact of each event. These

ratings are then summed, or a consensus is reached, to form an objective evaluation of the stressors that each child or adolescent has encountered.

Compared with checklists, interviews are more useful for research on particularly severe events, because they provide more detailed information. Interviews might also be better suited to study effects on mental health and medical outcomes, because they can date the occurrence of life events and ascertain the temporal order of stressful events and specific symptoms.

The biggest problem with interviews concerns their length and expense. A checklist can be administered and scored in a few minutes and can be group-administered to a large sample of individuals. An interview takes much longer, requires training for its administration and scoring, and can only be given to one person at a time.

EFFECTS OF STRESS ON PSYCHOLOGICAL AND MEDICAL OUTCOMES

More than 1,500 studies have examined the relationship between child and adolescent life stress and psychological outcomes. Common outcome measures assess depression, anxiety, substance abuse, eating disorders, and conduct problems. Stress is such an important component of theory and research on psychopathology that the most influential model is called the diathesis-stress model. In this model, individuals with the diathesis (vulnerability factor), which can be genetic or psychological, are at risk for a disorder if they are also exposed to sufficient life stress.

Cross-Sectional and Prospective Research Designs

However, the strength and regularity of the child stress–mental health relationship is unclear. One major reason for this uncertainty involves research methodology. The most typical methodology is a cross-sectional design in which life stress and outcome measures are administered at one point in time. However, this type of design is inadequate to measure the causal effects of life stress. It is possible that psychological status caused life stress rather than vice versa, or that a third variable (e.g., personality) influenced both life stress and psychological status. A prospective design is a more appropriate design, although it is harder to implement. In this design, life stress and psychological status are measured at one point in time, and then psychological status is measured again at a later time. Statistical analyses then test whether life stress can predict change in status from time 1 to time 2.

Daily Assessment Research Design

A recent methodological development in stress research is the use of a daily assessment design. In this type of study, stress and mood (or behavioral or health) variables are measured daily, or several times each day, over several days or weeks. Using a type of statistical procedure called multilevel modeling, researchers can examine the daily relationship between stress and outcomes such as mood and health, and also evaluate whether certain types of individuals (who vary on age, gender, or psychiatric status) show stronger or weaker daily stress-outcome relationships. For youth, these types of studies are being conducted to evaluate the daily relationships between stress and drinking, smoking, and binge eating.

There is also a large body of literature on the relationship between child and adolescent life stress and medical symptoms and outcomes. The same issues apply. A prospective design is superior to a cross-sectional design when testing the etiological (causal) role of life events. Daily studies are being conducted to test the daily relationships between stress and medical symptoms (e.g., pain) and health behaviors (e.g., medical compliance).

Positive Effects of Stress

Recently, stress theorists and researchers have begun to examine the positive consequences of life stress. For example, with adults, stress researchers have studied how cancer patients and victims of natural disasters have grown from these experiences and have gained wisdom and perspective as a result of these traumas. Obviously, growth takes time, and can only occur once coping efforts have been successful. But the same process might occur for children and adolescents. In other words, some children might benefit from some traumatic experiences, in the long run anyway. Future research is needed to determine which children might grow from which types of stress, experienced at which developmental period.

Moderators and Mediators

The terms *moderators* and *mediators* are very important when discussing the relationship between child/adolescent stress and psychological and medical outcomes. A moderator is a variable that influences the strength of the stress-outcome relationship. Some stressors might be strongly predictive of symptoms if experienced at a younger age compared with an older age, or if combined with an unsupportive family environment compared with a supportive family environment.

A mediator variable is a variable that "explains" the stress-outcome relationship. In short, it is the mechanism that underlies the causal relationship between stressful life events and symptoms. For example, a stress-depression relationship might be mediated by parental conflict. Family stressful events cause parental conflict, which then upsets a child. With respect to medical outcomes, life stress can affect the stress response of the hypothalamic-pituitary-adrenal axis, and immune functioning, which then causes health problems.

Current research is examining variables that moderate and mediate the psychological and medical effects of child stress. Although inconclusive to date, this research should contribute to our understanding of child development and to the development of preventive and treatment interventions for children and adolescents who experience high levels of stress.

SUMMARY

Stress is all too common in the lives of children and adolescents. There are various ways to define and measure stress, and various methodological approaches to study its effects on psychological and medical outcomes. Stress can cause a variety of mental health and medical problems. Fortunately, many children do not suffer as a result of stress, and some might benefit from the experience.

—Angela Farrehi, Kimberly Dasch, and Lawrence H. Cohen

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STROKE

Stroke symptoms were first described in the 4th century BC and, like many medical writings from the Classical Age of Greece, these descriptions are credited to Hippocrates. The disorder was termed "apoplexy," a Late Middle English word derived from the Greek *apoplexia* [æpYpleksi] meaning "being struck down" and *plexe* implying "a stroke" or "to beat." The word may refer to the most frequent symptom of stroke, hemiplegia, a sudden paralysis of one side of the body, often with loss of consciousness in a seemingly healthy person. In antiquity, sudden afflictions including apoplexy and epilepsy were attributed to possession or an attack by the gods, a belief not shared by Hippocrates. No questions into the cause of stroke were raised until the Renaissance and a "scientific revolution." During this period, the approach to understanding nature by thoughtful contemplation and reliance on writings by classical Greek scholars was replaced by using direct observation to test hypotheses. In the mid-1600s Jacob Wepfer conducted autopsies of patients who died after apoplexy and observed a blockade or bleeding of blood vessels in their brains and began the continuing experimental study of the cause of stroke. The venerable word *apoplexy* endured until the 1920s, when replaced by the term *stroke* during classification of its types. Recently, *brain attack* was introduced and is used interchangeably with *stroke* to convey an urgent need to seek medical attention.

There are two types of stroke: ischemic and hemorrhagic. Ischemic stroke is the most common type, accounting for approximately 88% of all brain attacks. They occur when blood clots stop blood flow in small branches of arteries supplying a focal brain region (Figure 1). Blood clots are classified as thrombotic or embolic, depending on where they form, an important consideration for patient management. A thrombus or thrombotic clot develops in brain arteries damaged by fatty buildups, or atherosclerosis, which stops blood flow supplying a focal brain region. An embolus or embolic clot forms outside of the brain and is carried in the bloodstream until it lodges in an artery leading to or within the brain, blocking blood flow. Embolic clots can result from "atrial fibrillation," an irregular heartbeat slowing blood flow, which allows formation of clots in pooled blood, causing 8% to 15% of all strokes.

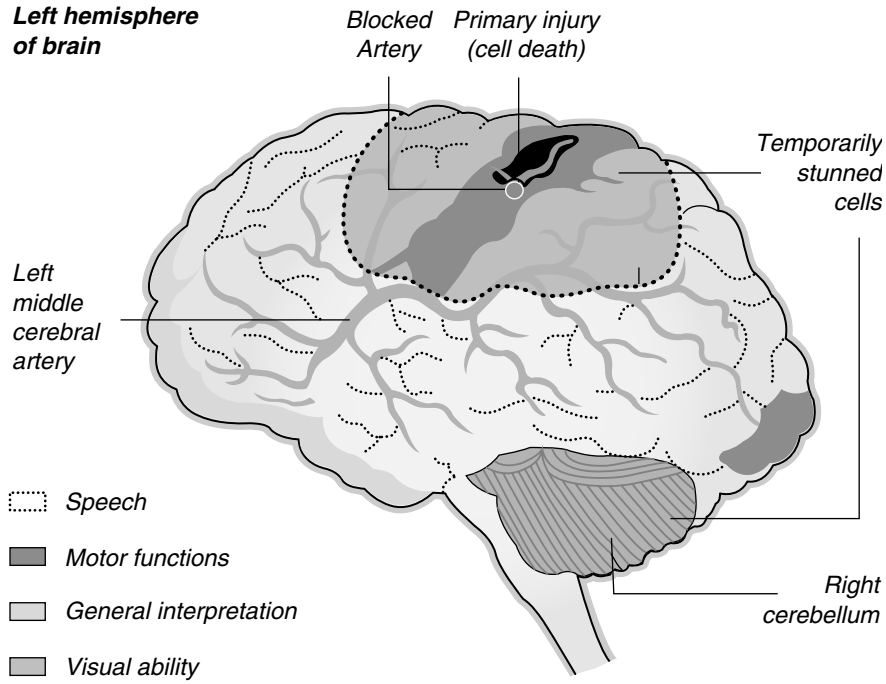

Figure 1 Illustration of the left hemisphere depicting some consequences of an ischemic stroke after a clot blocking blood flow in a branch of a major cerebral artery

As seen in Figure 1, the area of neuronal death in the left hemisphere is dark black and surrounded by regions of "temporarily stunned cells" or "dysfunctional neurons." Dysfunctional brain regions can now be detected using functional brain imaging methods, and appear in areas adjacent to the region of cell death and in structures remote from the injury as depicted in the cerebellum of the right hemisphere. Measuring both dysfunctional regions and the extent of dead cells gives a better account of stroke symptoms and are a target for experimental therapy. Gray areas labeled "speech," "motor functions," and so forth indicate symptoms likely to result when stroke involves that region. Since the extent of neuronal death is unchanged, amplification of any weak capacity of remaining cells related to symptoms is one hypothesis for the lessening of symptoms observed in most patients over the first 3 months after stroke. Symptoms of focal ischemia are often confused with the function of the damaged area but show the functional capacity of remaining viable brain areas.

Hemorrhagic strokes occur when a blood vessel wall ruptures, resulting in bleeding inside the cranium. There are two types of hemorrhages: subarachnoid and intracerebral. A subarachnoid hemorrhage occurs upon rupture of a blood vessel on the brain surface, and blood flows into the space between skull and brain. An intracerebral hemorrhage occurs when a blood vessel within the brain ruptures, flooding cells with blood components. Hemorrhagic strokes often result from head trauma and also can result from a ruptured aneurysm, blood-filled pouches formed at weak areas of vessel walls. These appear like defects in balloons after repeated inflation, and if untreated, a small aneurysm may continue expanding, further weakening the vessel wall. Hemorrhagic strokes also can result from an arteriovenous malformation, a cluster of enlarged blood vessels that form during fetal development. Their weakened vessel walls can rupture from forces exerted by normal blood flow. Depending on the amount of blood from a ruptured artery that increases pressure on the brain, pushing the brain against the skull, such strokes are often lethal because they suppress vital functions. By 1 month after a hemorrhagic stroke, approximately 38% of patients die, compared with 8% to 12% of ischemic stroke patients.

COMMON STROKE SYMPTOMS

- Numbness or weakness of the face, arms, or legs on one side of the body
- Inability to speak, read, or understand speech
- Confusion or loss of judgment
- Loss of memory
- Persistent headache with no known cause
- Marked change of personality, often depression
- Difficulty swallowing
- Disturbances of vision in one or both eyes
- Dizziness, loss of coordination and balance

Risk factors are characteristics or behaviors that increase the likelihood of stroke and include individual traits such as age and gender, lifestyle (such as smoking), and the presence of high blood pressure (HBP). Some risk factors, such as race, age, or family history of stroke, are unchangeable. Compared with white men of comparable age, African American men have twice the risk for stroke, are stricken at a younger age, and are more likely to die from stroke. However, this may be partly due to a higher incidence of other risk factors in black men compared with white men, such as HBP, obesity, and diabetes. Many risk factors can be controlled by changes in lifestyle or medication to reduce the likelihood of stroke. The most important risk factor for stroke is HBP, which affects 20% of Americans, but because it has no obvious signs, approximately 30% of those with HBP do not know they have it. Often HBP can be lowered by minor changes in lifestyle, such as consuming a healthier diet and increasing exercise. If necessary, drugs to control blood pressure are available by prescription. The more risk factors an individual has, the higher his or her chances of having a stroke. After age 55, the chance of having a stroke more than doubles for each decade of life, but numerical age is not the same as biological age. Few Americans discuss stroke with their physicians, even those who know someone who has had a brain attack. The importance of discussing stroke with a physician cannot be overemphasized because methods to prevent stroke by controlling risk factors are well established.

A type of risk factor, often not considered important enough to seek medical advice, are very short periods of stroke symptoms lasting only a few minutes. Short-lasting epochs of stroke symptoms, lasting less than 24 hours, are called transient ischemic attacks (TIAs) and are a warning that an ischemic stroke may be imminent. Most TIAs last less than 5 minutes, averaging less than a minute and often ignored. However, within 2 days after a TIA, 5% of patients suffer an ischemic stroke, and within 90 days, 10% have a stroke. A TIA is occasionally called a "mini-stroke," but it is a major risk factor, so one should call 911 promptly.

SOME CONTROLLABLE STROKE RISK FACTORS

- People with HBP have a four to six times higher risk for stroke, but blood pressure can be lowered and reduces the likelihood of a brain attack.

- The risk for stroke in heavy smokers (40-plus cigarettes per day) is twice that of light smokers (10-plus cigarettes per day). After stopping smoking, the risk for brain attack significantly decreases within 2 years, and by 5 years the risk is no higher than for nonsmokers.

- After age 55, periodic measures of cholesterol levels should be requested, especially if there are other risk factors. While high cholesterol levels may be metabolic, in many cases diet changes can reduce cholesterol intake and lessen the chance for stroke.

- Being overweight increases the risk for brain attack, and routine vigorous exercise, combined with a healthy diet, lowers the risk.

- Heavy alcohol consumption increases the risk for all types of strokes. Reports that moderate alcohol consumption reduces the risk for stroke are unclear. Some reports of reduced ischemic stroke in moderate drinkers also report increased hemorrhagic stroke in moderate drinkers.

- Some prescription drugs, including Vioxx and the over-the-counter pain reliever Aleve (naproxen), increase the likelihood of stroke.

- If at risk, inexpensive medications such as aspirin can prevent stroke.

The impact of a brain attack is personally and economically devastating. In the United States and other developed countries, stroke is the leading cause of severe disability and is the third leading cause of mortality after heart disease and cancer. In the United States a stroke occurs every 45 seconds, affecting more than 750,000 Americans every year, and of

these, 20% (160,000) die within a year after a stroke. For those older than 65, the mortality rate is higher. Stroke is often considered a problem of the elderly, but it occurs throughout our life span. Although rare in children, during the first 30 days after birth the likelihood increases, and 5 deaths in every 100,000 live births are caused by stroke.

Most patients survive a stroke but have some permanent disability that interferes with their ability to conduct daily activities. For patients over age 65, by 6 months after a stroke, more than 30% cannot walk without assistance and 19% have aphasia, the loss of some component of language, ability to speak, comprehend, read, or write. Within a year after stroke, 26% of stroke patients over age 65 are institutionalized in a nursing home. In the United States, the direct medical costs and loss of income average more than $50 billion every year, and the personal costs are incalculable. The estimated loss of quality-adjusted life-years caused by stroke is greater than for any other disease, resulting in an enormous economic burden on families and society. Without improved prevention or development of an effective therapy, the problem of stroke will increase due to the aging of the population.

There is no approved medical therapy for most stroke patients, and treatment primarily consists of supportive care. Only 3% to 5% of ischemic stroke patients can be administered tissue plasminogen activator (tPA), a "clot buster" that restores blood flow to prevent brain cell death and dysfunction. The 3-hour time limit is essential because tPA administration later than 3 hours after onset of symptoms fails to improve outcome and greatly increases the risk for severe hemorrhagic stroke. Additionally, tPA treatment is not recommended unless the facility is appropriately staffed and equipped. An appropriate center for tPA treatment of ischemic stroke requires diagnosis by a physician with expertise in diagnosing stroke that can be confirmed by neuroimaging. Because of the risk for tPA-induced hemorrhagic stroke, the facility must be able to handle bleeding complications and provide adequate emergent ancillary care. Not all hospitals have proper facilities, so for those at risk, an appropriate center should be located. Of those treated with tPA, 35% to 50% recover without significant disabilities, and others do not respond. For a small percentage of patients at high risk for stroke, surgical treatment is appropriate. If a patient had a TIA and has a fatty buildup in a neck artery that has reduced blood flow to the brain by 70%, a carotid endarterectomy may be warranted. To improve blood flow, the plaque is stripped away from the inner lining of the occluded artery, which reduces the risk for stroke.

Until recently, stroke was considered a human tragedy, not a treatable medical problem. Because symptoms were attributed to irreversible cell death from loss of blood supply, a curative "therapy" was thought impossible, especially for patients with a completed stroke who were transferred to "rehab." The quite limited goal of rehabilitation medicine was described in 1976 by the World Health Assembly to "help victims accept what is inevitable, to correct what is correctable and (learning to) adapt to new circumstances." It was clearly distinguished from the curative goals of scientifically based medicine. However, over the past two decades, experimental and clinical evidence has changed this dismal outlook to cautious optimism for development of a stroke therapy. In the 1980s, laboratory studies on brain injury suggested two qualitatively different strategies for developing a stroke therapy to lessen residual symptoms or promote functional recovery. The first was the observation of delayed neuronal death following cerebral ischemia or trauma. That many brain cells survive for several days rather than the few minutes for complete cell death broke a widely held assumption. This prompted extensive study of neuroprotective drugs that reduced delayed death in diverse laboratory models of stroke and trauma, and it was hypothesized that neuroprotective agents would also lessen symptoms in patients with brain injury. This received no support by any of the over 65 clinical trials administering neuroprotective drugs to stroke patients, but several clinical trials reported significant worsening of patient outcome. The second strategy for a stroke therapy was the observation that drugs increasing levels of noradrenaline enhanced hemiplegia recovery after ischemia or destruction of cerebral cortex. Further studies indicated that an enduring enhancement of recovery of hemiplegia required administration of drugs increasing noradrenaline levels, combined with active physical therapy and attempts to walk. While this approach has received much less attention than neuronal rescue, it has been extended to stroke patients. An increasing number of clinical trials of stroke patients report noradrenergic-enhanced physical therapy improves recovery of hemiplegia and aphasia. Importantly, this experimental treatment enhanced recovery even when treatment

was begun weeks to months after stroke onset, and the improved outcome endures for 8 to 10 months after stopping treatment. The association of increased noradrenaline levels with enhanced recovery is complimented by reduced noradrenaline levels slowing hemiplegia recovery in both laboratory studies and clinical trials using stroke patients. Drugs reducing noradrenaline levels are prescribed for HBP in stroke patients, and the clinical and laboratory data indicate that those drugs are contraindicated during recovery after brain injury. This enhanced recovery is proposed to involve dysfunctional neurons as described in Figure 1, one of many effects on brain function included in the concept of "neuroplasticity." These data initiated the study of "rehabilitation pharmacology," since drugs produce unique effects in brain-injured patients that alter the recovery process. The goal of rehabilitation is changing from adapting to a disability to improving outcome and developing a scientific base for "curative" goals during the rehabilitation phase for the treatment of stroke.

—Dennis M. Feeney

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STRUCTURAL AND FUNCTIONAL BRAIN IMAGING

Understanding the structure and function of the human brain is an essential key to understanding the development of personality and consciousness, and assists in the diagnosis and treatment of neurological and psychiatric illnesses. However, the direct study of the healthy human brain was not possible until recently. Being encased by the skull, the brain was not directly accessible for study except by invasive means. For many years, such information could only be obtained from humans using autopsy tissue or from neurological patients with severe head trauma. These data often lacked a clear relationship between brain structure and function. Information was also obtained from test animals, but the usefulness of this was limited by differences between humans and animals. Even given such limitations, many important findings have been made using these methods. However, in order to understand the workings of the normal healthy human brain, and to diagnose and treat neurological and psychiatric patients with a minimum of harm, information had to be obtained from healthy humans noninvasively and while still alive and able to function. Techniques now exist to examine the human brain without damage to the brain itself. There are two basic types of brain imaging: anatomical imaging that provides information about the inner structure of the brain and functional imaging that provides information about the activity of the brain.

ANATOMICAL BRAIN IMAGING

Anatomical imaging began with the discovery of X-rays by Wilhelm Roentgen in 1895, for which he was awarded the first Nobel Prize in physics in 1901. X-rays are a highly energetic form of light wave that can pass through soft tissue (such as skin, brain tissue, and muscle) but are stopped by hard tissue such as bone. By 1896 Thomas Edison had developed the first fluoroscope, which was used to produce and image X-rays, and many hospitals were using them routinely by the turn of the century. More recently, computer-assisted tomography (CAT) has been developed to produce three-dimensional images using X-rays. By injecting a radiopaque dye into the bloodstream that stops X-rays, it is possible to obtain images of veins and arteries in the brain. This can be used to detect malformations in blood vessels as well as tumors and strokes. However, this method is still limited by its inability to image the brain in detail, and to distinguish between gray and white matter.

Structural imaging of the brain began in earnest with the development of magnetic resonance imaging

(MRI). The first MRI was created by Paul Lauterbur in 1972. By 1980, MRI had become a viable technique for medical imaging. MRI is used to produce images of atomic nuclei through the use of radio waves and magnetic fields. A typical MRI has a magnetic field of 1.5 Tesla, which is about 30,000 times stronger than Earth's magnetic field. This has the effect of making the nuclei precess (or rotate about their spin axis) at a frequency proportional to the strength of the field that they experience. The hydrogen nucleus, which is composed of a single proton, is the most commonly imaged since hydrogen is the most common atom in the body. A 1.5-Tesla field makes the hydrogen atoms precess at approximately 63.9 megahertz, which is a slightly lower frequency than a typical FM radio signal. Radio waves of this frequency are transmitted into the brain and are absorbed by the protons, and after a short time these protons are induced to send radio waves back in return. Depending on how the scan is obtained, MRI can be used to produce a map of the density and environment of water in each part of the brain. Since gray matter and white matter differ in the amount of water, complex fats, and proteins they contain, they appear as different intensities in the final MRI. This method provides beautifully detailed images of the human brain where even subtle damage can be observed. MRI has proven invaluable for the diagnosis of many neurological disorders. Paul Lauterbur and Peter Mansfield shared the 2003 Nobel Prize in medicine for their development of methods for performing MRI.

Because MRI can be repeated often in the same individual, and is safe to use in children, it has been used to show patterns of normal and abnormal development from birth through old age. MRI can be used to obtain a variety of measurements from the human brain. Diffusion tensor imaging (DTI) recently was developed to map the course of axonal fibers that connect neurons in the brain. This may eventually be used to examine how the brain is "wired" together, and thus tell us something about how brain regions communicate and transfer information. While imaging the anatomy of the brain is valuable in many ways, equally important is gaining an understanding of how the brain functions.

FUNCTIONAL BRAIN IMAGING

The earliest method for imaging brain function was electroencephalography (EEG), discovered by Hans Berger in 1925. Neurons produce small electrical and magnetic fields as they function. Their activity leads to changes in the EEG that can be recorded using sensitive electrodes and amplifiers. The earliest studies revealed that the brain produces electrical activity of different frequencies during different stages of consciousness. Rapid activity is seen during alert wakefulness, slowing during rest, and becoming slower still with sleep, coma, and finally stopping in death. EEG has been used by clinicians to detect brain damage, such as spikes in the EEG associated with epilepsy, and slowing of EEG frequency associated with brain damage.

Evidence of thought processes can also be observed in the EEG, such as activity evoked by the perception of sound or light. However, most such responses are too small to be seen in the large ongoing background EEG. Event-related potentials (ERPs) are obtained by averaging multiple EEG responses to the same stimulus repeated many times. This reduces the size of the random background EEG so that the average event-related response can be seen. ERPs have been used by clinicians to check for deafness or visual acuity problems in patients who cannot respond, such as babies, and have been used as a method of communication for patients who are completely unable to move any part of their body after severe brain damage, called "locked-in syndrome." ERPs provide the only way that these patients can communicate with the outside world. ERPs have been used to examine healthy human brain functions, including sensory perception, attention, language, motor control, and memory, among many others. One disadvantage to EEG and ERPs is that it is difficult to identify the exact brain regions where the activity was generated. This results in part from the high electrical resistance of the skull, which reduces the passage of electrical fields, and problems with identifying the exact size and position of electrical sources in the brain from surface recordings.

While the skull is resistive to electrical fields, it allows magnetic fields to pass almost unimpeded. Magnetoencephalography (MEG) is similar to EEG but records magnetic impulses. Because these fields are so small, a device is used with very sensitive coils that are cooled to the temperature of liquid nitrogen. This makes the coils able to detect small magnetic fields. While MEG is more expensive than EEG, its ability to detect the location of epileptic foci and other types of brain damage has made it a valuable technique for diagnosis and treatment of these disorders.

Functional imaging methods that use radioisotopes are single positron emission computed tomography (SPECT) and positron emission tomography (PET). These methods can be used to examine blood flow, metabolism, neurotransmitter release, and receptor density as well as other aspects of brain chemistry and function. PET and SPECT employ radioactive nuclei joined to chemicals similar to those found normally in the body. Once injected, these chemicals are used by the body, and PET and SPECT are used to find where they are present in the body and at what concentration. This information is used to infer something about how these chemicals are used and what the body is doing.

More recent methods for examining brain activity use MRI to detect changes in blood oxygenation, volume, and/or flow, called functional magnetic resonance imaging (fMRI). The most commonly used methods for fMRI depend on a peculiar magnetic property of blood. As the brain works, it uses oxygen that is supplied by hemoglobin, which contains iron attached to a protein. As the brain works harder, it sends a signal to the blood vessels to increase the amount of blood being delivered to that region. This changes the amount of hemoglobin present, and the level of oxygen in the hemoglobin. When hemoglobin has oxygen, it has little interaction with magnetic fields. However, when it loses oxygen, it develops a stronger magnetic field than the one it is exposed to, called paramagnetism. MRIs can be obtained in a way that makes them susceptible to these small changes in magnetic fields. Because the body supplies more oxygenated blood than is used by the brain, an increase in brain metabolism results in an increase in oxygenated blood, and this leads to an increase in MRI signal. By comparing changes in MRI signal intensity with changes in an experimental task, this allows one to find brain regions involved in the task. This method has been used to identify brain regions involved in such disparate activities as navigating through space, recognizing faces and other objects, selective attention, vigilance and attentional control, and many others. It has also proven useful for documenting changes in brain function associated with psychiatric disorders such as obsessive compulsive disorder, antisocial disorder, schizophrenia, and drug abuse, among others.

Magnetic resonance spectroscopy (MRS) is another MRI-based method that can be used to detect and measure changes in brain function. MRS measures certain metabolites, including neurotransmitters such as GABA, glutamine, and glutamate, among others. In normal aging, there is a reduction in N-acetyl aspertate (NAA) levels with increasing age, which is related to the health and activity level of neurons. Some brain disorders, such as schizophrenia, show a faster reduction in NAA with age, suggesting more rapid brain degeneration than normal.

SUMMARY

Using anatomical imaging techniques such as X-ray, CAT and MRI, and functional imaging techniques such as EEG, MEG, PET, SPECT, and fMRI has led us to a better understanding of the structure and function of the human brain, and the development of new methods for the diagnosis and treatment of neurological and psychiatric illnesses. Further research will lead to improvements upon what we have already discovered, and will provide us with a deeper understanding of the structure and function of the human brain.

—Vincent P. Clark

See also Brain Development

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STUTTERING

Stuttering is a communication disorder in which the flow of speech is broken by repetitions (t-t-t-today), prolongations (rrrrrrestaurant), blocks (silent or audible pauses in speech), or circumlocutions (word substitutions to avoiding stuttering on certain words). Everyone is disfluent at times and may have repetitions and prolongations at times. However, normal disfluencies tend to be a repetition of whole words or the interjection of syllables like *uh* and *er*, while stuttering tends to be repetitions or prolongations of sounds and syllables, not whole words. People who stutter often experience a feeling of loss of control regarding their speech, and for some people who stutter, talking is accompanied by excessive tension in the facial muscles and/or body.

The onset of stuttering typically occurs between the ages of 2 and 7, although onset can be later. It is estimated that approximately 5% of children stutter at some point in their development; however, approximately 75% spontaneously recover and regain normal speech fluency. Males stutter more frequently than females. The male-to-female ratio is approximately 4 or 5 to 1; however, at onset the ratio is closer to 2 to 1, indicating that girls are more likely to recover than boys.

Numerous theories about the cause of stuttering have been proposed. Early theories about stuttering typically focused on a single cause. More recent thinking focuses on a combination of factors coming together to cause stuttering, and it is probable that the cause of stuttering is not the same for all individuals. Although the definitive cause or causes of stuttering have not been pinpointed through research, it is likely that genetics and physiology play a key role in the onset of stuttering. Approximately 60% of people who stutter have a family member who stutters. Recent neurophysiological research also indicates that people who stutter process speech in different areas of the brain than those who do not stutter. Although environmental factors do not cause stuttering, the pressure to speak quickly and precisely may play a role in determining whether stuttering will manifest in a particular child. Children and adults who stutter are no more likely to have psychological problems that those who do not stutter, and there is no evidence to suggest that emotional trauma causes stuttering.

The goals of speech therapy treatment for stuttering are to increase fluency and to communicate effectively and freely. There are no scientific data that indicate the general superiority of any specific treatment approach. Typical treatment strategies include gentle onset of sounds, starting air flow just prior to initiating speech, maintaining continuous airflow while talking, articulating lightly, and reducing the rate of speech. For very young children, speech therapy is often "indirect," encouraging parents and caregivers to use a slower rate of speech with longer pauses to reduce speaking pressure the child may feel and to model desired speech. More direct therapy for preschoolers has been gaining popularity recently, in which the child is instructed to identify stuttered speech and then retry the stuttered sentence "without the bumps."

Since many children who stutter by the time they reach school age will continue to do so to some extent for the rest of their lives, stuttering for older children, teenagers, and adults also focuses on dealing effectively with stuttering so that it does not become a burden or hinder effective communication. For older children, teenagers, and adults, therapy often includes strategies for reducing physical tension during moments of stuttering and reducing the overall severity of stuttering. Therapy for teenagers and adults may involve desensitization exercises or activities to help increase acceptance of their stuttering. Paradoxically, greater acceptance of stuttering using leads to increased ability to utilize speech therapy techniques, increased

fluency, and less negative impact from stuttering on daily communication.

—John C. Wade

See also Language Development

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SUCKING BEHAVIORS

The act of sucking is a complex task for the neonate demanding coordination of sucking, swallowing, and breathing. Thus, a full-term infant is more likely than a preterm infant to handle the complex demands of feeding with ease. Understanding the organization of nutritive sucking in the newborn may assist in early identification of infants at risk not only for feeding dysfunction, but also for neurobehavioral delays. The significance of this cannot be underestimated because it helps us identify infants at risk for later feeding and/or developmental problems.

An infant with an intact central nervous system is able to react to the feeding stimulus with increasing efficiency. In contrast, an infant who has experienced a neurologic insult may not develop a mature pattern of sucking through the early weeks of life. The rhythmic activity of sucking is seen in most full-term newborns during the first hour of life, with increasing sophistication of organization during the first days of life. Initially newborn sucking is entirely reflexive, relying on rooting, latching, and sucking activities. The establishment of rhythmicity of sucking patterns is dependent on the nuclei ambiguous, solitarius, and hypoglossus in the lower portion of the medulla and the nucleus trigeminalis. Thus, with medullary neuronal injury after hypoxic-ischemic insults there is a disturbance of the sucking organization. Maturation of sucking behaviors appears with infant volition through both sensory input and feeding experience and is a complex enough activity to help us understand much about the central nervous system of these infants almost instantaneously.

A variety of methods have been used to quantify nutritive sucking, including ultrasonography with recording electrocardiography and respiratory patterns; documentation of the infant's oral responses necessary for effective feeding; the implementation of the revised Neonatal Oral Motor Assessment Scale (NOMAS); and use of a suckometer with videotaping and visual observation of the infant's performance. The most frequently used method has been the pressure transducer embedded in the nipple with the ultimate goal of quantitative analysis of the sucking process because it appears to be the most objective measurement form. Typical sucking parameters that have been quantified include the number of sucks, number of bursts, number of sucks per burst, time between sucks, time between bursts, consumption (pressure × length of suck), and mean maximum pressure. The complexity of measures allows us to see not only how infants suck at a particular age but also how their sucking organization improves over time.

In the preterm infant, nutritive sucking organization improves with increasing maturity, with increasing gestational age or increasing postconceptional age (PCA). For example, as an infant matures from 32 to 36 weeks PCA, a typical sucking record would show an increase in the number of sucks, number of sucks per burst, decrease in time between bursts, and increasing sucking rate. Using a cross-sectional age approach, the same pattern is true when examining sucking patterns of infants with varying gestational ages (GA), so that an infant born at 33 weeks GA would have a less mature sucking pattern than the infant born at 35 weeks GA during the first week of feeding. By term, infants with gestational ages between 32 and 35 weeks have nutritive patterns similar to those of full-term infants. In contrast, to term sucking patterns of infants born at 24 to 29 weeks GA appear less mature than either preterm infants with longer GAs or full-term infants.

At present, assessment of sucking rhythms has been confined to research protocols, but has the potential to become part of routine neonatal clinical practice. It offers clinician and researchers the opportunity to evaluate an infant's neurologic status during the earlier stages of the neonatal period resulting in more appropriate intervention for the infant at risk for developmental delays.

—Barbara Medoff-Cooper

See also Reflexes

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SUDDEN INFANT DEATH SYNDROME (SIDS)

Sudden infant death syndrome (SIDS) is the term used when the death of a healthy infant (a) occurs suddenly and unexpectedly and (b) medical and forensic investigation findings are inconclusive. Because an infant's death is diagnosed as SIDS when no other cause of death can be determined, the factors surrounding the cause of SIDS have generated a recent increase in the research and educational efforts to better understand SIDS. Although there has been a recent spike in SIDS interest, cases of infant deaths for no apparent reason—other than assumed smothering, because the infant was found in the parent's bed—have been long documented. The criteria for the diagnosis of SIDS have changed over the history of the research.

In the 1940s, for example, the leading cause of SIDS was thought to be infectious disease. In the 1960s and 1970s, SIDS conferences brought together researchers from multiple backgrounds yielding research goals and a consensus on the broad epidemiological components of SIDS. Researchers concluded that the diagnosis of SIDS is warranted only when a healthy infant unexpectedly dies and autopsy reveals no clear cause of death. In the 1980s, the definition of SIDS was again modified to include a thorough investigation of the death scene before the diagnosis could be issued.

A leading hypothesis in the medical literature suggests that infants who die from SIDS have abnormalities in the area of the brainstem responsible for regulating breathing. Other hypotheses are derived from the idea that a parent or caregiver is responsible for the suffocation of the infant. If the definition of SIDS includes intentionality, then it may be presumed that there are cases diagnosed as SIDS, when in fact the infant was murdered. Beginning in the 1980s, research indicated that (a) 2% to 10% of cases diagnosed as SIDS were in fact filicides and (b) more than 50% of SIDS cases were in fact cases of physical abuse, neglect, and accident.

Due to the ambiguities of the nature of SIDS, uncovering the characteristics surrounding SIDS may appear a daunting task for researchers. With the developing research that suggests that many SIDS cases are murders, it is imperative that forensic scientists and those in the social and behavioral sciences focus greater effort on identifying the predictors of SIDS.

—Viviana A. Weekes-Shackelford and Todd K. Shackelford

See also Death, Infant Mortality

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SUICIDE

Human beings are remarkable for their resilience, ability to cope with adversity, and fierce will to survive; they are also unique in the animal kingdom in their propensity for self-destruction. Attempts to come to terms with this puzzle are present throughout literature, from Hamlet's soliloquy ("To be or not to be . . .") to Camus' observation that suicide constitutes "the only really serious philosophical problem."

Suicide, the intentional act of ending one's own life, accounts for more than 1 million deaths per year worldwide. As a violent cause of death exceeding war and homicide combined, it constitutes a major public health problem, yet is regarded as one of the top preventable causes of death. Suicide is observed in all societies, across geographic and historical locales, although its meaning and frequency differ considerably from one place to another.

HISTORY

Suicide has been documented throughout recorded history. As early as the third millennium BC, Egyptian history reveals accounts of completed suicides, suicide notes, and even suicide threats to obtain sympathetic treatment. Historian Flavius Josephus wrote extensively about suicide, documenting individual and mass suicides between 1500 BC and 73 AD. Among these was the famous incident at Masada, wherein 960 soldiers killed themselves rather than face defeat and possible capture by the Romans.

Attitudes about suicide have varied through the ages, from neutral tolerance or implicit approval to total condemnation. Ancient Egyptians, because they saw death only as passage to another state of being, viewed suicide rather neutrally, whereas the Romans considered suicide an appropriate and honorable means of avoiding defeat or humiliation. At the opposite end of the spectrum were the ancient Judaic prohibitions against suicide. Elements of this prohibition survive to this day in contemporary Judaism, Christianity, and Islam, although views have softened somewhat in modern times. For example, the Catholic Church now teaches that, rather than being condemned to eternal damnation, people who kill themselves are likely suffering from an illness and are therefore unable to make a truly free choice.

SUICIDE SCIENCE

Modern theorists generally consider suicide as part of a collection of suicidal behaviors, including suicidal ideation (contemplating suicide without taking action), suicide attempts (engaging in self-harming behaviors that do not result in death), and suicide (intentional, self-inflicted death, sometimes referred to as suicide completion). The term *suicide attempt* is problematic because intentional self-harm is not always intended to end life but may serve a communication function such as a "cry for help." For this reason, such behavior is sometimes referred to as deliberate self-harm or parasuicide.

In the United States, suicide consistently ranks among the top 10 causes of death, taking nearly 30,000 lives per year. The suicide rate in the United States has seen a slight, steady decline in recent years, from about 12 per 100,000 population per year through the 1980s and early 1990s to 10.8 per 100,000 per year in 2001. Suicide rates are strongly and consistently associated with an assortment of population characteristics, including sex, race, age, and geographic location. Although females make suicide attempts two to three times as often as males, fully 80% of deaths by suicide are males. Whites commit suicide more often than any other racial group, accounting for more than 90% of all suicides in the United States. African Americans commit suicide at only half the rate of whites.

The age group at greatest risk for suicide is the elderly, with suicide risk rising sharply after age 65 (this mainly reflects high rates of suicide among elderly males). The suicide rate for adolescents has risen sharply in recent decades, to the point that teenagers now commit suicide at a rate comparable with that of the general population. Suicide rates vary sharply from state to state and region to region, with the highest rates generally appearing in the Rocky Mountain states and the lowest rates in the Northeast.

Suicide is also a leading cause of death internationally, with gradually rising rates in recent years. Male suicide rates are much higher than female rates

in almost every country, although China is a notable exception. The World Health Organizations' 2003 statistics showed that countries with the highest suicide rates include Lithuania, Russia, Belarus, Latvia, Ukraine, Slovenia, and Hungary. Countries with the lowest suicide rates include Antigua and Barbuda, the Dominican Republic, Honduras, Jordan, Saint Kitts and Nevis, and Saint Vincent and the Grenadines. However, it is difficult to compare suicide rates among countries; data are often not up to date, and data-gathering procedures are sometimes unreliable and vary from one country to another.

CAUSES OF SUICIDE

Why would anyone intentionally end his or her own life? There is no single, proven cause for suicide; to the contrary, suicide is now recognized as a complex phenomenon resulting from multiple influences. These include biological, environmental, and psychological factors.

Biological factors are reflected in family studies suggesting genetic influences, although it is unclear whether suicidal tendencies themselves are inherited or whether people merely inherit a genetic predisposition to mental disorders that are associated with suicide risk. Neurobiological studies have consistently demonstrated involvement of dysregulated serotonin systems in the brain, which are thought to raise the likelihood of impulsive and aggressive behaviors.

Environmental factors play key roles as well, as indicated by studies showing heightened risk in individuals lacking in social support or with childhood histories of neglect or abuse. Physical illness also seems to play a role, since one third of adult suicide victims are physically ill at the time of their deaths. However, studies also have shown that suicidal ideation among terminally ill patients is not typical and is usually more a result of clinical depression than the terminal condition.

Psychological factors also play important roles. Perhaps the best understood influence is mental illness. "Psychological autopsy" studies consistently have shown that more than 90% of people who die by suicide have histories of some psychological disorder, most notably clinical depression, bipolar illness (manic-depression), schizophrenia, or alcoholism. In addition, studies of thinking patterns of suicidal individuals have consistently shown the importance of hopelessness, deficient problem solving, sense of being a burden to others, perceived lack of belongingness, perfectionism, memory deficits, and other cognitive vulnerabilities.

SUICIDE PREVENTION

Preventing suicide requires recognition of risk factors and warning signs. Factors known to be associated with increased risk for suicide include history of a previous suicide attempt, family history of suicide, diagnosed psychiatric disorder, depressed mood (especially if combined with anxiety or agitation), hopelessness, multiple recent losses, social isolation, abuse or neglect in childhood, impulsivity, aggressiveness, and chronic anger.

Recognizing warning signs that a person is contemplating suicide can be crucial in obtaining help for that individual. Suicidal communications should be taken seriously: studies have shown that more than two-thirds of people who committed suicide gave some indication of their intentions prior to the act. Other warning signs include preparations for death (making out a will, suddenly taking out life insurance, giving away prized possessions, "mending fences" with loved ones), expressions of hopelessness, uncharacteristic risk-taking behaviors or other dramatic changes in behavior, preoccupation with death, and references to suicide in drawings, writings, or songs.

Although the vast majority of suicidal individuals suffer from treatable disorders, more than half never receive appropriate diagnosis and treatment. However, there is little doubt that suicidal individuals can be helped. Both psychotherapy and psychotropic medications (such as antidepressants) are effective for most conditions that predispose to suicide, and often are used in combination. A collaborative therapeutic relationship with a competent professional is a key ingredient in the effective treatment of suicidal individuals.

Public health approaches to suicide prevention have increased dramatically in recent years. The U.S. Surgeon General issued the Call to Action to Prevent Suicide in 1999, identifying suicide as a major public health problem and urging public health officials at all levels to help reduce the suicide rate in the United States. This was followed by the National Strategy for Suicide Prevention in 2001, in which steps to reduce suicide are outlined, including broadening the public's

awareness of suicide and its risk factors, enhancing services and programs throughout the country, and advancing the science of suicide prevention.

—Thomas E. Ellis and Pamela R. Tenney

See also Assisted Suicide, Cluster Suicide, Parasuicide

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SUPEREGO

Sigmund Freud coined the term *superego* in 1923 in his work *The Ego and the Id*. In that work, Freud developed what has been called his structural model of the mind. In that model, the mind is divided into three psychic agencies: the ego, the id, and the superego. The superego refers to the part of the mind responsible for conscience. Self-criticism, shame, and guilt emanate from the superego, as does self-acceptance. The superego evaluates the self in terms of moral standards and approves or disapproves of the self accordingly.

Freud viewed the superego from a developmental perspective. The superego is based on identifications with parental approval and disapproval. Yet the child perceives parental approval and disapproval through the distorting prism of his or her own wishes, conflicts, anxieties, and defenses. Freud believed that the superego arises as a resolution of the Oedipus complex. The child wishes to have an incestuous relationship with the desired parent and wishes to murder the rival parent. These forbidden wishes give rise to feelings of guilt and fears of retribution, such as castration for the little boy. The fear of punishment for these forbidden incestuous and parricidal wishes becomes the basis of the superego. The child identifies with the rival parent and decides to marry someone like the desired parent when the child grows up.

The superego is perceived as omnipotent and omniscient just as the young child views the parents as all-powerful and all-knowing. The child is motivated to listen to the superego not simply out of fear of punishment but also out of a wish to grow up and enjoy adult prerogatives, privileges, and powers, especially those related to adult sexuality. Freud believed that precursors to the superego could be seen in the child's acceptance of parental discipline during the anal phase of psychosexual development when the child is being toilet trained.

Melanie Klein added to Freud's superego theory by suggesting an earlier origin of the superego in the infant's initial relationship with a nurturing mother during the oral phase of development. Klein suggested that the infant deals with frustration of dependency needs by projecting that infantile rage onto the mother, who is then perceived as a bad, angry mother. Fear of a "bad" mother who is hostile to the child's needs becomes the basis of a particularly harsh and punitive superego. Klein suggested that the child feels a primitive form of guilt when the child worries that his or her aggression has damaged the mother. The urge to make reparations, to assume responsibility for fixing the damage wrought by one's own aggression, becomes the inspiration for mature superego functioning.

In psychoanalytic theory, the superego is multifaceted. It has permissive and prohibitive, harshly punitive and lovingly accepting, rational and irrational aspects. The superego is only partially conscious, since the harsher aspects are often repudiated out of fear of punishment. Certain forms of psychopathology have been thought to derive from an unduly harsh superego. Depression derives from a cruel superego that generates irrational self-blame. Obsessional self-doubt and worry derive from a perfectionistic superego that is excessively fault-finding.

—Lawrence Josephs

See also Ego; Ego Development; Freud, Sigmund; Psychoanalytic Theory

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SURROGATE MOTHERS

The term *surrogate mother* is occasionally used to mean the foster caregiver of orphaned children, often an older sibling or a maternal relative. Most commonly, however, surrogate motherhood refers to participation in the conception and gestation of a child by a woman who will not be a primary caregiver after the child is born. A woman may act as a surrogate mother when she becomes pregnant by artificial insemination, gives birth, and surrenders the child to another woman who will care for the child and act as the child's social and emotional mother. She may also be termed a surrogate mother when another woman's fertilized ovum is implanted and develops to term in her uterus, and the newborn infant is given to another woman (sometimes the source of the ovum, sometimes not) who will act socially and emotionally in the role traditionally called "mother," whom we may call the caregiving parent. In either case, the woman who carries the child may be called a *gestational surrogate*, and this term may be preferable to *surrogate mother* because it does not imply a social role as "mother" does.

HISTORICAL BACKGROUND

Some forms of artificial insemination have been possible as long as fertilization has been understood, but gestational surrogacy as a practice first came to public notice with the much-publicized case of Mary Beth Whitehead and Baby M in 1986. Mrs. Whitehead had entered into a contract with a childless couple, agreeing to be inseminated with the husband's sperm, to bear and surrender the resulting child, but after the birth she was reluctant and gave up the little girl only after months of negotiation. By 1994, complex forms of assisted reproductive technology (ART) had developed, creating a variety of beginnings for gestational surrogacy, as well as attempts to solve some of the legal problems inherent in the practice.

INCIDENCE AND TECHNOLOGY

At least a thousand births a year in the United States result from gestational surrogacy. Depending on the reasons for the couple's childlessness, the technology involved ranges from fertilization in vivo with sperm from a donor or from the intended caregiving father, to hormonal stimulation of ovulation to obtain an ovum from a donor or from the intended caregiving mother, followed by in vitro fertilization with sperm from a donor or the intended caregiving father, and transfer of the fertilized ovum to the uterus of the gestational surrogate.

OUTCOMES AND RISKS

Risks to Infant

Risks are increased with all forms of gestational surrogacy that involve ART procedures rather than simple artificial insemination. For all ART procedures, whether or nor gestational surrogacy is involved, the proportion of resulting live-born infants is about 25%. The increased likelihood of multiple births with ART is associated with complications of pregnancy, premature births, low birth weights, and long-term disabilities resulting from these conditions.

Risks to Donors, Surrogates, and Families

Ovum donors in ART procedures experience some medical risk factors connected with stimulation of ovulation by medications, as well as the surgical procedure that retrieves the ovum. In some procedures, the gestational surrogate also undergoes increased risk because of medical and surgical treatment. The gestational surrogate has a slight increase of risk factors as a result of childbirth, as compared with her risk if she did not bear a child.

Families with a history of childlessness and the experience of ART, with or without gestational surrogacy, have emotional concerns that are different from those of "natural" family formation, and may benefit from counseling for parents and for children as the children grow up.

LEGAL AND ETHICAL ISSUES

Early gestational surrogacy arrangements were often made as personal contracts, with the potential for

ethical and legal flaws. Today's practice of arrangement of surrogacy through a clinic has lessened the possibility that one party or another will be exploited.

One of the first major ethical concerns about gestational surrogacy was the idea that the childless persons were buying a baby by contract, as some of the first surrogacy agreements implied. Direct purchase of a child, or of an embryo or ovum, is not legal in the United States. However, practical considerations for the gestational surrogate include the possible loss of income during the pregnancy, interruptions to employment or schooling, and medical fees not generally covered by health insurance. Reimbursement of the gestational surrogate for these expenses is appropriate, as is some reimbursement to ovum donors for their time and inconvenience.

Suitable informed consent documentation should be carried out with both gestational surrogates and ovum donors, as it would be for medical procedures done for other purposes. The New York State Task Force on Life and the Law has also recommended that clinics waive charges when carrying out experimental treatments with no clear evidence basis.

A potential problem for gestational surrogate arrangements arises if either the surrogate or the intended caregiving parent changes her mind about the agreement. Court decisions have tended to favor the gestational surrogate as the "real mother" if she wants to keep the child. In one case, neither the surrogate nor the intended caregiving parent wanted to care for a handicapped child born of a surrogacy arrangement.

After the child's birth, the caregiving parents are faced with ethical decisions about disclosing the family's unusual history, either to the child or to others. Lack of knowledge on the part of the child may be a cause of a later unintentional consanguineous marriage, however.

Ethical and legal views of gestational surrogacy are shifting. In 2004, Italy prohibited all ART procedures, including procedures related to gestational surrogacy. Laws and court decisions in the United States are also changing as new problems arise, such as the question of disposal of unneeded embryos after a pregnancy has been achieved.

RELIGIOUS AND CULTURAL CONCERNS

Gestational surrogacy has been regarded with suspicion by some major religious groups. The Roman Catholic Church takes the approach, consistent with its views on abortion, that conception and birth need to occur in the context of marriage and as a result of natural events; this excludes gestational surrogacy as well as all forms of ART. Muslims consider these forms of reproduction wrong, especially in light of their long tradition of foster parenting without formal adoption or family membership. In Judaism, the tradition of passing Jewish identity from mother to child raises questions if either the surrogate or the caregiving mother was not Jewish.

Culture-based attitudes are also important here. In Japan, surrogate motherhood is not approved, and in one recent case children born of a surrogate in the United States as a result of insemination from a Japanese father were not considered to be Japanese by a Japanese court.

The difficulty and expense of gestational surrogacy make cultural attitudes irrelevant outside a few industrialized societies.

MOTIVATIONAL AND ATTITUDINAL FACTORS

One reason for couples' seeking to arrange gestational surrogacy is the very real emotional distress associated with infertility, a problem experienced by 7% to 8% of American couples. Both men and women react with grief and distress to the realization of difficulties with reproductive success, and marriages may be negatively affected, no matter which partner is "at fault." Gestational surrogacy may be a way of ensuring a sense of reproductive success to the husband, when a physical condition of the wife prevents their shared parenthood. Gestational surrogacy may actually be more accessible to some couples in the United States than adoption of a healthy infant.

Couples dealing with infertility may wish for gestational surrogacy using their own sperm and ova, if possible, to ensure that the child will resemble at least one of the caregiving parents as much as possible. This resemblance may be related to important aspects of the marital relationship, or may be desired as a way to obscure the couple's reproductive problems, potentially made public by a child who was very different in appearance.

Male same-sex couples who wish to be parents may find that gestational surrogacy, arranged through a clinic, is more appealing than either adoption, with its scrutiny of lifestyle, or informal arrangements with women.

Finally, we may note that some potential parents share a folk belief that a genetic connection is a factor in a good parent-child relationship, with attachment deriving partly from the genetic relationship; for these people, surrogacy would be more desirable than adoption of an unrelated child.

THE FUTURE OF SURROGATE MOTHERHOOD

The future of gestational surrogacy may be assured by a continuing increase in fertility problems, possibly related to a tendency to delay childbearing until later in life. Risks to the child's health, in the case of ART procedures, may be lessened as guidelines for limiting the number of embryos are developed. Better understanding of and help for families' psychological concerns may also be achieved as the history of gestational surrogacy continues.

—Jean Mercer

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SYMBOLIC PLAY

Symbolic play is play that involves mentally transforming people, objects, or events, or acting as if something were true. Consider a child who pretends to "feed the baby" by putting a block to the lips of a doll; the doll is treated as though it were alive and the block as though it were a bottle of milk. Such activities foreshadow the ability to engage in hypothetical reasoning and immerse oneself in fictional worlds.

Symbolic play usually appears in the second year as single, self-directed actions with realistic objects (e.g., the child holds an empty cup to the lips, as though drinking). With development, the scenario may incorporate more actions (in the earlier example of giving the "baby" the "bottle," the child may add "burping" the "baby"), may include actors other than the self (e.g., the "baby"), and may involve less realistic objects (e.g., the block as "bottle"). Both role assignments and object use follow predictable developmental pathways, increasing in complexity and abstractness.

Children's understanding of pretense as creating an imaginary reality also undergoes developmental change. Even 2-year-olds understand that, once an imaginary situation has been created, subsequent actions must be consistent with that alternate universe. For example, if an empty cup is said to contain "coffee" which is "poured" on the floor, the child will use a sponge to "clean up." Preschoolers communicate the boundaries of the pretend universe, stepping "out of character" to negotiate the next phase of the play, or to converse briefly with an outsider. However, children under age 4 may not recognize that pretense is a mental, rather than physical, activity. If they are introduced to a character described as knowing nothing about kangaroos, and yet is hopping up and down like a kangaroo, very young children will typically say that the character is pretending to be a kangaroo (i.e., they apparently do not understand that knowledge, not action, is critical to pretense).

Symbolic play development is closely linked with other important cognitive and social achievements. As predicted by Jean Piaget's theory of cognitive development, the appearance of symbolic play actions and sequences parallel first words and first sentences. Children who are adept at role play or at social pretend play tend to have an advanced "theory of mind" (understanding of mental states), possibly because they practice "putting themselves into another person's shoes." Theorist Lev Vygotsky argued that

conforming to the rules and/or social roles of the pretend universe supports children's ability to distinguish between thought and actions, facilitating the development of abstract thinking and self-control.

Pretending is often a social activity, and although it is apparently universal, it is shaped by cultural beliefs and practices. In middle-class European American homes, parents often support children's early symbolic play development by structuring play scenarios. For example, the parent of a 15-month-old might suggest, "Let's cook dinner," stir some blocks in a pan, and offer the child a "taste." In some other cultures, adults do not engage in pretend activities, and a sibling or other child may provide the social structure for emerging play abilities.

Clinicians use symbolic play as a marker of developmental progress and as a window into children's emotional states. Symbolic play may be absent or delayed in developmental disabilities (e.g., children with autism rarely engage in symbolic play and show limited theory of mind development as well). Children's play may help them work through emotionally significant issues such as connection or separation from others, a sense of their own power versus weakness, and physical health versus harm. Thus, symbolic play has both cognitive and emotional significance in children's development.

—Cecilia M. Shore

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T

Testosterone

He's a guy. They don't talk, they fight. It's all that crazy testosterone.

—Samantha, *Sex and the City*

T CELLS

T cells or T lymphocytes are a subset of white blood cells that play a major role in eliminating pathogens and cancer cells that escape the body's first line of defenses. On the basis of their function in the immune response, T cells are divided into two categories: T helper (TH) lymphocytes and cytotoxic T lymphocytes (CTLs). TH cells orchestrate the activity of other cells of the immune system by releasing messenger molecules known as cytokines and are subdivided into T helper type 1 (TH1) and T helper type 2 (TH2) cells on the basis of the cytokines they produce. TH1 cytokines preferentially direct immune responses against pathogens that invade cells and against tumors, whereas TH2 cytokines preferentially direct immune responses against extracellular pathogens. CTLs eliminate target cells, such as tumor cells or cells infected by viruses, by producing molecules that form pores on their surface. CTLs then use the pores on the target to insert additional molecules that specifically induce cell death.

All mature T cells express a specialized molecule on their cell surface. This molecule, or T cell receptor (TCR), is used to recognize a small portion (antigen) of the pathogen. Each T cell (and each of its daughter cells) expresses a unique TCR that recognizes only one or a few closely related antigens. T cell progenitors are produced in the bone marrow and then migrate to the thymus to mature, hence the etiology of the name T cells. Once T cells mature, they leave the thymus and circulate in the blood and lymphatic system. The antigen recognition process requires the encounter of the TH cells with other specialized cells of the immune system. These cells are called antigen-presenting cells because their function is to display the antigen to the TCR expressed on the cell surface of the TH cell. If the TH cell recognizes the antigen, it becomes activated, proliferates, and differentiates, thus producing a set of molecules necessary to induce other cells of the immune system to eliminate the pathogen. CTLs encounter target cells at the site of infection. After performing their specific function, most of the responding T cells die. However, some T cells become memory T cells and persist for a long time. In subsequent exposures to the same pathogen, memory T cells are responsible for faster immune responses that may prevent disease development.

When functional T cell numbers are below normal, immunodeficiencies result. Immunodeficient individuals are highly susceptible to infections and tumors. Two heritable immune deficiencies are DiGeorge syndrome and severe combined immune deficiency (SCID).

In DiGeorge syndrome the thymus fails to develop and consequently few T cells mature. Individuals with SCID fail to produce functional T cells and B cells because of mutations that disrupt the mechanism for gene rearrangement responsible for TCR expression. B cells also require this mechanism to produce antibodies. Human immunodeficiency virus (HIV) causes acquired immunodeficiency syndrome (AIDS). HIV indirectly and directly kills TH cells and leads to a progressive decline in TH cell numbers. Healthy individuals usually have 500 to 1500 TH cells per cubic millimeter of blood. AIDS develops generally once this level declines below 200. Inappropriate T cell responses can lead to autoimmune diseases. During maturation in the thymus, T cells that strongly recognize the body's own molecules die by a process called negative selection. Some autoimmune diseases involve self-reactive T cells that escape this selection process. In type I diabetes, T helper cells recognize and direct the destruction of pancreas cells that produce insulin. These types of disorders demonstrate the crucial role that T cells play in the immune response and emphasize the importance of maintaining balanced T cell functions.

—Roberta Attanasio and Kenneth A. Rogers

See also Human Immunodeficiency Virus (HIV)

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TABULA RASA

English philosopher John Locke proposed that the mind of the newborn infant is a tabula rasa, or blank slate, on which experience writes. Locke was an empiricist. Development, in the empiricist view, is the product of an active environment operating on a passive mind.

One alternative to empiricism is nativism. Nativists propose that the human genetic heritage includes knowledge accumulated over the course of evolution. Thus the mind of the newborn, far from being a blank slate, represents the knowledge of generations. Development, in the nativist view, is a maturational process directed by the genes. It is genes, not environments, that account for developmental change.

An alternative to both empiricism and nativism is constructivism. Constructivists propose that the mind is an active agent in its own development, and not just an outcome of environmental and/or hereditary forces. Development, in the constructivist view, is a creative process directed by an active mind.

There is evidence for all three of these views. Research on learning, socialization, and enculturation shows the powerful influence of environmental and cultural forces in directing the course of development, as expected by empiricists. Research on infant cognition has shown remarkable competencies at unexpectedly early ages, supporting the nativist view. And research on children of all ages shows that ongoing processes of interpretation, reflection, coordination, and reconstruction are indispensable to developmental change, as argued by constructivists.

The existence of evidence for all three of these views rules out strong versions of any of them. If environments, genes, and minds are all important sources of developmental change, then none of these alone is the basis for development. Virtually all developmental psychologists see development as an ongoing interaction of environmental, hereditary, and constructive forces. Theorists differ, however, in which factors they highlight and in how they conceptualize those ongoing interactions.

The intellectual descendants of Locke are learning theorists who stress the role of the environment. Over the past several decades, however, learning has increasingly been viewed as an active process of construction made possible by the genetic heritage of the human species. Thus, differences among contemporary theorists are mostly a matter of differing emphases rather than stark disputes over what single factor causes development.

For parents, teachers, and others who work with children, there is no doubt that environments can and should be organized to promote learning and

development. Empiricism reminds us that, no matter what else is going on, children are learning from their environments, and such learning contributes to their development. Thus, empiricism supports the assumption that socialization and education are worth the effort.

Blank slate empiricism goes too far, however, in its presumption of environmental determinism. We cannot determine the course of development for our children or students. Development is a self-regulated process guided, in part, by genes and mental actions. Parents and teachers who understand this process may be able to encourage it, contribute to it, and even influence its course. If we think we can direct and control a child's development, however, we may intervene in ways that do more harm than good.

The infant is surely not a tabula rasa, and its development is not simply caused by its environment. Psychologists continue to debate, however, how much knowledge we should attribute to the infant at birth, and how minds, genes, and environments interactively generate developmental change.

—David Moshman

See also Locke, John

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TASTE

Taste is often described as a primitive sense. In order to successfully feed; identify kin, mates, and individuals; and avoid noxious and hazardous compounds, all creatures have a need to detect the chemicals in their environment. The senses of taste, smell, and chemesthesis (chemically activated pain, touch, and temperature) work in unison to allow them to do so. The sense of taste detects relatively small, water-soluble chemicals, and when ingesting foods it is often combined with the sense of smell, which detects comparatively large, air-soluble compounds. Taste begins functioning in humans before birth and, despite large individual differences, it remains relatively stable throughout the life span.

WHAT IS TASTE?

In everyday usage, the term "taste" is used to refer to all the sensations experienced when eating a food or drinking a beverage. However, once a substance is placed in the mouth, the individual experiences a multitude of sensations, including taste, smell, touch, temperature, sound, and sometimes even pain and irritation; this collection of sensations is more accurately referred to as "flavor." More precisely, taste is restricted to the sensations that arise from the stimulation of taste receptor cells found throughout the mouth, especially on the tongue. These taste receptors are stimulated by water-soluble compounds that are relatively small. The spectrum of taste sensations is far more limited than those of smell; just how limited is still a matter of debate.

Taste receptor cells are sensory receptor cells that transduce, or convert, a taste compound into a neural signal that is transmitted to the brain. These receptors are organized into taste buds, which are made up of taste receptor cells and supporting cells. Taste buds, in turn, are contained within papillae, of which there are four types. In the oral cavity, all but one type (filiform) contain taste buds. Fungiform papillae are scattered over the front two thirds of the tongue and can be seen as red bumps that stand out in contrast to the pinkness of the rest of the tongue. Circumvallate papillae are located toward the very back of the tongue in an inverted "V". Foliate papillae are very far back on the sides of the tongue and look like a series of folds or lines. The filiform papillae, which do not contain taste buds, cover the remaining surface of the top of the tongue. Taste buds are also found on the back of the throat (epiglottis) and the soft palate (the rear portion of the roof of the mouth).

Are There Four Basic Tastes?

For over a century, the predominant view has been that taste sensations are limited to four basic tastes: sweet, sour, salty, and bitter. However, this hypothesis has never been proven and there are now many prominent researchers who believe in the existence of a fifth basic taste, called "umami." This taste is associated with the taste of MSG (monosodium glutamate, the primary ingredient in Accent seasoning) and is often described as a "brothy" or "savory" taste. There

are still others who believe that the entire concept of basic tastes is flawed and feel that the evidence supporting this idea is based more upon language limitations than on perceptual or physiological ones. In fact, to date, no precise definition of a "basic taste" or "taste primary" (other than a list of four or five distinct sensations) has been accepted, nor have four or five physiological mechanisms or structures of taste been discovered. Regardless, it is clear that there are far fewer categories of taste sensation than smell sensation.

The Taste Map

The biggest and most pervasive myth regarding taste is that sweet, sour, salty, and bitter are perceived only on certain distinct regions of the tongue. In actuality, all taste compounds can be tasted in every region of the tongue, as long as taste receptor cells are stimulated. There are regional differences in sensitivity to different compounds, but the taste map grossly oversimplifies this reality and ignores taste receptors that are located on the palate and the back of the throat.

If tasting is believing, it is simple enough to prove to yourself that you can taste sweet, sour, salty, bitter, and umami at the tip of your tongue. Simply collect a few items that are characterized by these flavors (e.g., sugar, salt, lemon juice, coffee, and Accent) and dab each on the tip of your tongue in succession. You can readily perceive each of these distinct tastes, and there is no need to wait for the coffee to touch the back of your tongue, lemon juice the sides, etc. You can further examine falsity of this myth by dabbing a cotton swab containing each of the compounds on other regions of your tongue as well.

TASTE THROUGHOUT THE LIFE SPAN

Humans begin perceiving taste in the womb and continue to taste chemicals throughout their entire life span. Taste is thought to help guide in food selection, acceptance, and rejection. Sweetness is typically an indication of a high-calorie food source and typically elicits a positive hedonic response. In contrast, bitterness (possibly an indicator of alkaloid poisons) and sourness (possibly an indicator of food spoilage or lack of ripeness) are more likely to elicit a negative response, although this is dependent upon intensity levels, context, and familiarity. Umami tends to elicit positive responses, while responses to saltiness show the greatest amount of inconsistency, varying from positive to neutral to negative.

Taste Before Birth

By late gestation, the number and distribution of papillae are similar to those found throughout childhood and adulthood. By the sixth month of gestation, the taste system is functioning and the fetus can be observed to respond to the presence of taste compounds.

Taste in a Newborn

Newborns can perceive sweet, sour, salty, bitter, and umami compounds. Under all testing conditions, they respond positively to sweetness, while their responses to other tastes are more dependent upon the testing conditions. In general, responses to umami compounds are positive, responses to sour and bitter compounds are negative, and responses to saltiness show individual reactions that range from positive to negative.

Taste in Children

Children perceive taste much in the same way that young adults do. They differ from newborns in that experience and context have a larger impact on preferred levels of taste compounds. For example, as compared to their intake of water, toddlers will increase the amount of sucrose solution they consume with increasing concentration, but unlike younger children they will reduce their consumption of salt solutions with increasing concentration. However, toddlers prefer salted to unsalted soup and cereals, suggesting that the context in which the compounds are tasted, in solution versus in a food, impacts preference.

Ratings of taste intensity in older children is very similar to that of adults, although there do seem to be differences in preferences. Children have a tendency to prefer higher concentrations of salt and sucrose, presumably due to differences in nutritional needs. Cultural and gender differences are evident at this stage, with research indicating that both can influence preferences.

Changes With Advancing Age

From the ages of 20 to around 70, there are small but reliable decreases in taste sensitivity, while after 80 there are larger decreases. Taste thresholds rise slightly with age (indicating less sensitivity to low concentrations), taste identification decreases slightly and taste intensity ratings decline for some, but not all,

taste compounds. For which gender and at what age sensitivity lessens are questions that are complex and not fully resolved. Also unresolved are for which compounds these sensitivity reductions occur, at what rate, and at what magnitude. It is clear that there are some small reductions in sensitivity with age, but that these age-related decreases for taste are typically later in time and lesser in degree than those that occur for other senses, such as vision and hearing.

—Jeannine Frances Delwiche

See also Sensory Development

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TAY-SACHS DISEASE

Tay-Sachs disease was named after two physicians, British ophthalmologist Warren Tay and American neurologist Bernard Sachs. Both described the disease independently in 1881 and 1887, respectively. Tay-Sachs disease is an inborn error associated with the abnormal breakdown of a particular sugar-containing lipid called GM2 ganglioside. The important hallmarks of Tay-Sachs disease are a massive storage of GM2 ganglioside in the brain and also in the macular region of the eye, on which an ophthalmologist can detect the characteristic "cherry red spot." Clinical onset of this disease is usually at 5 to 6 months of age, and the symptoms include retardation in development, loss of motor function and intellectual capacity, and blindness. The disease progresses rapidly and is usually fatal by the age of 3 to 4 years old. However, some with milder cases have lived into teens and adulthood. The disease incidence in Ashkenazi Jewish population is about 1 in 4,000 births, while the incidence in non-Jews is one hundred times lower. The disease is inherited from parents in an autosomal recessive manner. This means that each parent, though not affected by the disease, carries a defective gene in an autosome (the chromosomes other than the sex chromosome), and the affected child has inherited a pair of chromosomes both containing the defective gene.

The normal breakdown of GM2 ganglioside requires a specific enzyme, β-hexosaminidase A (Hex A), and a helper protein called GM2 activator. Thus, Tay-Sachs disease can be caused by the deficiency or defect of either Hex A or GM2 activator. Human tissues contain two forms of β-hexosaminidases, Hex A and Hex B. Hex A contains two different protein chains, alpha- and beta-chains, and Hex B contains two beta-chains. Therefore, Tay-Sachs disease can result from the mutations in any one of the three genes, which are responsible for making the alpha-chain, the beta-chain, and the GM2 activator. Based on the mutations in these three genes, Tay-Sachs disease can be classified into three types: type B (also called classical Tay-Sachs disease), mutations in the gene for making the alpha-chain; type O (also called Sandhoff disease), mutations in the gene for making the beta-chain; and type AB, mutations in the gene for making the GM2 activator. Among these three, Sandhoff disease is the most severe type.

There is no treatment for Tay-Sachs disease at present. Since this disease primarily affects the brain, the effective introduction of therapeutic agents to the brain and to the proper location of the brain cells has been a continuous challenge. Various therapeutic options have been considered, such as (1) enzyme replacement therapy to provide a purified normal enzyme or an activator protein; (2) bone marrow transplantation to provide cells that can produce the functionally active enzyme or activator protein; (3) reduction of GM2 ganglioside formation to minimize its accumulation; and (4) gene therapy to correct the defective gene. However, these methods of treatment are currently only in experimental stages. Simple and rapid analytical methods are available for detecting the Hex A activity, as well as the gene mutations

for carrier screening and prenatal diagnosis. The establishment of effective screening procedures represents one of the most important contributions to Tay-Sachs disease. These analyses, together with genetic counseling, have greatly reduced the incidence of Tay-Sachs disease in the Ashkenazi Jewish population, and the disease is now considered a rare disorder. To date, the clinical management of this disease is limited to a patient's supportive care and prevention or treatment of the secondary illness, if occurring. The National Organization for Rare Disorders (NORD), a voluntary health organization, has been established to help people with rare diseases and to provide assistance to the organizations that serve them. The activity of NORD is centered on the identification, treatment, and cure of rare disorders through programs of education, advocacy, research, and service.

—Su-Chen Li and Yu-Teh Li

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TEENAGE PREGNANCY

When a fetus is conceived in a woman or female adolescent under the age of 20, it is considered a teenage or adolescent pregnancy. In the early 21st century, 30% to 60% of all female adolescents became pregnant and as many as 78% of those pregnancies were unplanned. In many countries this represented 30 years of decreasing rates; however, in some countries teenage pregnancy rates continued to climb.

PROBLEMS IN TEENAGE PREGNANCY

Although normal human development includes puberty and increased sexual interest, a resulting teenage pregnancy has many developmental risks for both mother and child during pregnancy, at birth, and throughout life. First, adolescent pregnancy tends to postpone or stop a female adolescent's formal education. With little education, teenage mothers are likely to have little earning potential and economic security. Research from the United States also suggests that adolescent fathers lose as much as 15% of their educational achievement and earning potential. Additionally, fathers of children born to adolescent mothers rarely provide enough income to fully support their children, so many teenage mothers and their children live in poverty and use social welfare programs to survive.

A teenage pregnancy also limits a female adolescent's social and personal growth. Adolescent mothers tend to have more pregnancies and spend more of their young adulthood as single parents than women who postpone childbearing until adulthood. Considering that their sexual partners tend not to marry them and that many cultures prohibit childbearing outside of marriage, teenage mothers also experience a great deal of social stigma. In addition, teenage mothers have fewer chances of future marriage, and if they do marry their chances of being abused, abandoned, or divorced increase.

In view of the educational, economic, social, and personal challenges facing pregnant teenagers, some turn to abortion. In many countries, adolescents have difficulty finding and paying for safe abortions. Furthermore, teenagers often delay obtaining an abortion until later gestation, which can lead to life-threatening medical complications. Although emotional problems from abortion are rare, they are more likely to occur when the adolescent delays obtaining the abortion, is undecided about the abortion, has no support for the abortion, or has psychological problems outside of the abortion.

Pregnancy is a leading cause of death for teenage females because their bodies are not completely ready for childbearing. Approximately 70,000 pregnant adolescents die each year in developing countries. In developed countries, pregnant adolescents (17 and younger) are 2 to 4 times more likely to die during childbirth than women in their 20s. Pregnant teens are also at greater risk for complications including toxemia, hypertension, anemia, placenta previa, and premature delivery. Poverty contributes to these complications because poor teens are often malnourished. Moreover, malnourished or growing female adolescents are likely to have undersized pelvises causing

prolonged or obstructed labor. Compared to pregnant adults, pregnant adolescents are more likely to smoke, less likely to gain adequate weight, and less likely to receive timely and adequate prenatal care (resulting in unidentified and untreated pregnancy complications).

These potential conditions also put the infant in danger. Infants of adolescent pregnancies are more likely to die (more than 1 million each year in developing countries), to be born prematurely, and to be a low birth weight (less than 5.5 pounds). They are more likely to have organs that are not fully developed, leading to brain, vision, intestinal, urinary tract, or lung problems (such as respiratory distress syndrome). These infants can also have malformed limbs, especially if the mother smoked early in her pregnancy. Teenage pregnancy infants are also at risk for acquiring, dying from, and being impaired by sexually transmitted diseases (STDs) if their mother has an untreated STD. Adolescent mothers are at high risk for untreated STDs because young people have the highest rates of STD acquisition and STDs in females are often undetected.

Children born to adolescents are also likely to experience many problems as they grow up. First of all, teenage parents have few parenting skills and few resources for dealing with parenting stress. Therefore, these children tend to have less developmentally stimulating environments and experience more mistreatment of all kinds, such as abuse and neglect. Consequently, they are likely to experience less educational, economic, and social success than other children. In the United States, for example, they tend to abuse drugs, drop out of school, initiate sex early, engage in criminal activity, have emotional and behavioral problems, and experience teen pregnancy themselves. Moreover, these outcomes can be aggravated if the child is deprived of a close connection to the father.

Teenage pregnancy also has serious consequences for society. In the United States, millions of tax dollars are spent each year for health care, foster care, criminal justice, and public assistance due to teenage pregnancy. Furthermore, the loss in academic achievement due to teenage pregnancy leads to lost productivity and a loss in human potential for society.

FACTORS ASSOCIATED WITH TEENAGE PREGNANCY

Although pregnancy occurs from sexual intercourse between a male and a female, there are many other overlapping and interrelated factors that may foster the incidence of adolescent sexual intercourse and pregnancy. Worldwide improvements in health and nutrition contribute to lowering the average age of menarche and to increasing teenage fertility, so more female adolescents are capable of becoming pregnant. Additionally, early menarche is associated with increased risk for teenage pregnancy.

Access to and knowledge of contraceptives are also factors in teenage pregnancy. If an adolescent is sexually active over a 12-month period without using contraception, she has a 90% chance of becoming pregnant. Consequently, wherever birth control licensing, advertising, selling, and services are restricted, adolescent contraceptive use is constrained and teenage pregnancy rates are higher. These barriers to youth reproductive control are created by laws, policies, and media censorship that are frequently fostered by social taboos, gender bias, and opposition from religious leaders.

Poverty exemplifies another set of teenage pregnancy factors. When communities are compared worldwide, adolescent childbearing tends to be more common in those communities with high rates of poverty, mobility, unemployment, crime, and teen suicide. In addition, early childbearing is rarely thought to be a source of concern in poor communities; it is often considered a normal part of life, even a measure of success or adulthood. Considering that education may be unavailable or seem unattainable in these communities, childbearing may seem to be a more reachable goal. It is therefore understandable that adolescents who give birth are three times as likely to have low levels of educational achievement.

Teenage pregnancy is also linked to several family factors. For example, being raised in a single parent family, in a large family, away from parents, or with a mother or sister who was a teenage parent tends to increase an adolescent's risk for pregnancy. Additionally, parents of pregnant teenagers often have low levels of education and income. Moreover, pregnant teenagers tend to experience poor parental communication and insecure parental attachment, as well as maltreatment and abuse.

Many behavioral factors are also associated with teenage pregnancy such as early dating, many sexual partners, same-sex behavior, cigarette or marijuana smoking, alcohol or drug use, and delinquent activity. Pregnant teenagers are less involved in friendships and school, family, and community activities than those who are not pregnant. The friends of pregnant

adolescents tend to be teenage parents themselves. Moreover, an adolescent female who becomes pregnant is likely to have a sexual partner who is married, is 3 or more years older, or is abusive.

Emotional, perceptual, and cognitive factors are also related to teen pregnancy. Adolescents with low self-esteem, low educational expectations, little faith in their future, and depression are at high risk for pregnancy. Furthermore, pregnant teenagers and their partners tend to perceive little or no opportunity for success, ease in childbearing and parenting, low educational expectations from parents, or pregnancy as a symbol of manhood. These factors may also contribute to a perception of pregnancy as a positive step for some teenagers. Sexually active adolescents, not reliably using contraceptives, tend to lack the ability for thought reversal and consideration of alternatives. Furthermore, they tend to believe that pregnancy is not a likely consequence of their sexual behavior. Pregnant teenagers tend to exhibit an external locus of control (i.e., believe their lives are controlled by forces outside their own behavior). Emotional problems, cognitive immaturity, and perceptual disempowerment may intermingle in adolescent sexual decision making and place them at risk for pregnancy.

PREVENTING TEENAGE PREGNANCY

Considering the risks and costs in an adolescent pregnancy, programs to prevent teenage pregnancies have developed worldwide. These programs focus on sexual or nonsexual factors related to teen pregnancy. Programs based on nonsexual factors do not deal directly with teen sexual behavior. They try to improve the cognitive development of children via early childhood programs or strengthen youth academic and vocational skills or youth ties to the community, school, or family. These programs have some success in reducing sexual activity and teenage pregnancies.

Programs based on sexual factors evolve from several perspectives: abstinence until marriage or adulthood, sexual functioning and contraceptive education, reproductive health services (i.e., information, professional health care counseling, and contraceptives), peer counseling and discussion groups, and parent communication on sex. To date no abstinence-only program has shown a significant positive change in teenage sexual behavior. However, sex education programs that discuss contraception tend to reduce the number of sexual partners for adolescents. Moreover, providing adolescents with contraceptive information or with access to contraceptives does not bring about an earlier onset to sexual intercourse nor does it foster an increase in the amount of sexual intercourse or number of sexual partners. The most effective programs focus on sexual behavior, contraceptive use, abstinence as the safest protection, and contraception as the second safest protection from pregnancy.

—Danae E. Roberts

See also Adolescence, Puberty

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TELEVISION

The effects of television viewing on child development have been contested since the medium's inception in the early 20th century. Some have argued that television clearly has negative effects on youth, while others believe these effects are, at best, ambiguous. While it is uncertain which perspective is right or wrong, it is quite certain that this debate has galvanized social scientists, parents, and politicians, exemplified by the weight this issue carries each election year.

EARLY FINDINGS

As commercial television flourished in the United States in the 1940s, interest began to foment with

regard to television's effects on the first generation of individuals raised alongside the new medium. In 1949, the Columbia Broadcasting System, also known as CBS, sponsored a study conducted by Rutgers University that found television increased family unity, did not promote viewer passivity, and did not replace other valued diversions, such as outdoor activities and social interactions. This landmark report was one of the first and most widely disseminated of its kind, and several more would follow in the forthcoming decade. Soon, however, questions were raised about whether television viewing decreased dialogue between children and parents, and whether children could be expected to maintain academic progress as their average total viewing time increased to then-shockingly high numbers of more than 20 hours a week. Eventually, broadcasters capitalized upon these youthful watchers by developing targeted programs such as puppet shows and Saturday morning cartoons. Although these were highly popular, many children were also watching wrestling shows, TV westerns, and mystery-crime dramas, all of which incorporated a significant amount of violence into their storylines. This, in turn, raised even more concerns about the impact of television on American youth.

RESEARCH ON THE EFFECTS OF TELEVISION VIOLENCE ON CHILDREN

In a significant number of studies, Albert Bandura found that children learn from and imitate the behavior of individuals they observe, specifically when the individual is rewarded for aggressive acts. This research finding corroborated the admonitions of those who suggested that children who constantly witnessed their favorite TV "heroes" being praised for beating up or killing the "bad guy" would, in turn, incorporate aggressive acts into their own repertoire of behaviors for use in situations characterized by conflict. Throughout the following decades, psychologists, sociologists, criminologists, and other social scientists have argued a number of different perspectives with respect to whether television violence facilitates or triggers violent behaviors in children. Some believe that watching violence on television likely causes a significant number of children to behave violently. Others have agreed that this may be true, but only with children already susceptible to exhibiting violence. As a result, some have argued for tighter controls, either voluntary or legislative, concerning what should and should not be allowed on the airwaves. Alternately, some have blamed parents instead of the broadcasting industry, and contended that mothers and fathers are ultimately to blame for their children's television viewing habits. A general point of agreement (or compromise) among the research community is that television can have effects on the behaviors of children, but that it must be considered as one of many determinants that may or may not cause a child to act in a particular manner.

OTHER POTENTIAL EFFECTS OF TELEVISION VIEWING ON CHILDREN

The debate of whether violence on television begets violence in children may be the most salient issue, but some social scientists argue that television programming has negative effects on children beyond promoting aggressive behavior. For example, television shows appear to perpetuate gender and racial stereotypes, and in general offer young viewers a largely unrealistic perspective of how the world and its people behave and exist. In addition, parents have complained about the content of certain shows, contending that even the most "child-friendly" programming may present values that contradict those they wish to pass on to their offspring. The most common examples involve how sex, alcohol or tobacco use, or illicit drug use can be found in most television broadcasts. Similarly, commercials promoting alcohol, tobacco, or other products inappropriate for children have been singled out.

Health care professionals have also raised concerns about how much time children spend watching television, rather than what they are watching during that time. For example, they believe that children who spend more time watching television are going to spend less time engaging in physical activity. This trend, along with the ubiquity of fast food advertisements during such programs, may be largely responsible for America's current obesity epidemic. Additionally, psychologists argue that the large amount of time spent watching TV threatens the cohesiveness of the family. These negative effects may also include inhibiting the social development of children by diminishing the number of conversations between them and their family members.

Despite all of the negative influences attributed to television, some commentators note that the medium can have a positive effect on youth. For instance,

television programs are quite commonly used in school classrooms, and teachers may use educational videos or segments recorded from network broadcasts to accentuate their lessons and enhance interest in students not amenable to learning from the traditional lecture format. Also, television programming has provided individuals exposure to a wider array of cultures and societies. Additionally, more young people are aware of political and social issues of the day because of television viewing, which in turn may increase their influence on their respective nation's government. In contrast, critics have deemed in-classroom channels like "Channel One" as simply guises by which advertisers can reach younger buyers.

POLICY ISSUES

Over time, politicians have realized that the promotional value of television is a significant element in elections. Not only do candidates rely on television to reach potential voters, but also to raise television's proposed effects on youth as a campaign issue. For example, in 1992, U.S. Vice President Dan Quayle criticized the television show *Murphy Brown* for its positive depiction of a single mother, and in 2001, former U.S. vice presidential candidate and Connecticut Senator Joe Lieberman criticized the MTV cable network for airing a show titled *Jackass* that highlighted gratuitous, masochistic violence among youth. Consequently, the realm of public policy has been affected, as legislators have advocated for stricter regulation of what is shown on TV. In the U.S. in 1996, Congress mandated that V-chips, devices that parents can use to block out programming inappropriate for children, be installed in every television set produced after 1999. In 1997, the entertainment industry, pressured by Congress to enact a ratings system to work in conjunction with the V-chip technology, developed the "TV Parental Guidelines," a ratings system based somewhat on the Motion Picture Association of America's long-standing system of rating movies, where television shows are marked as "G," "PG," "R," and so on. Despite these efforts, the content of television appears to have become increasingly more violent and sexually charged. Studies indicate that most parents do not utilize the V-chip in their homes, which may render the effects of such legislation negligible.

Although the television broadcasting community has been largely compliant in providing ratings and guidelines for their shows, they generally challenge governmental attempts to restrict their product. In essence, they argue that television is part of the free enterprise system, and any attempt to control the content of it violates constitutional principles. Critics of this position argue that most countries have laws that ensure that television programming is regulated in order to make certain that what is aired does not contradict laws guarding against public indecency and obscenity. Further, the European Union has integrated the minimum television programming standards of its 15 member nations to reflect the supposed values of its constituency. These include the restriction or prohibition of discrimination based on race, sex, or nationality and the limitation of shows highlighting behavior detrimental to one's health or safety. Another example includes Australia, where there has been an added emphasis in recent years to curb the amount of violence seen on television. Regardless, television broadcasters continue to resist such measures, contending that the content of their programming is a reflection of the world around us, not the cause of it.

CONCLUSION

The effect of television viewing on children's behavior is a highly contested topic that arouses a range of reactions from researchers, parents, and politicians alike. In essence, it is hard to argue that today's youth are not affected by what is broadcast on TV. However, it is equally difficult to pinpoint particular shows or genres of programming as causing specific behaviors in children without considering the innumerable amount of alternate influences that may have an effect on the actions of young individuals.

—John L. Powell III and Michael C. Roberts

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TEMPERAMENT

Temperament is the emotional and regulatory core of personality, incorporating traitlike individual differences in emotional, attentional, and motor reactivity and self-regulation. It is present early in life and has a biological basis, and develops through a person's interaction with the environment. For example, shy children avoid social interactions with unfamiliar others. An initial temperamental predisposition of shyness can lead to differential approach and avoidance of strangers throughout childhood. In addition, people engage in "niche picking" or selecting environments that match their temperament type. Outgoing surgent individuals are more likely to participate in team sports and other community activities. Temperamental characteristics also *evoke* different responses from others in the environment. Individuals prone to irritability are sometimes approached more cautiously by others. Temperament includes both reactivity and self-regulation. As self-regulation develops across childhood, it influences emotional, attentional, and motor expression. Attention systems shift from a more reactive system to a more executive system early in childhood, and individuals have more conscious control over their emotions and activity.

TEMPERAMENT AND PERSONALITY DISTINCTIONS

Along with experience, temperament influences the development of personality. Personality is a broader concept, including habits, skills, goals, values, needs, the content of individual thought, and the perception of the self in relation to others. By studying individuals across development, there is some evidence that child fearfulness and irritability correspond to the adult personality dimension of neuroticism, whereas child positive approach and activity level correspond to extraversion. Similarly, childhood persistence may be related to adult constraint.

DIMENSIONS OF TEMPERAMENT

The most well-known and widely used theory of temperament was developed by Alexander Thomas and Stella Chess. They defined temperament as the stylistic component of behavior. Based on parental descriptions of infant behavior, they identified nine dimensions of temperament for further investigation. These nine dimensions are approach/withdrawal, quality of mood, distractibility, persistence, threshold, adaptability, rhythmicity, intensity of reaction, and activity level. From these dimensions they formed three temperamental types: *Easy* children are high in rhythmicity (high regularity in sleep, eating, defecating), high in adaptability (accept change readily), and are not overly active, intense, or moody. The second type is called *slow-to-warm-up*; these children have slower adaptability and higher negative responsivity. Over time, these children do adapt positively to novelty. Lastly, *difficult* children are characterized by irregularity in bodily functions (low rhythmicity), low adaptability, and high negative moodiness.

Children classified under this system as difficult are more likely to experience later behavior problems than easy or slow-to-warm-up children, although the prediction depends on the *goodness of fit* with their environments. Goodness of fit characterizes the match between the child's temperament and the demands of the situation or expectations of others. A good fit predicts healthy development, whereas a poor fit generates stress and leads to problem behaviors and disorders.

More recent empirical examination of the dimensions in this framework has revealed the nine dimensions to be highly intercorrelated and conceptually overlapping. In fact, several studies have revealed that the item pool can be reduced to a smaller number of dimensions, which are outlined in Table 1.

MEASURING TEMPERAMENT

Temperament is most commonly assessed through parental report, examiner report, or behavioral observation techniques. There are structured (e.g., the Laboratory Temperament Assessment Battery) and unstructured (e.g., observation on the playground) behavioral observation paradigms. Behavior is typically videotaped and scored later for facial, vocal, and/or motoric indicators of temperament. Emotionality and activity are characterized by individual differences in the latency to, peak intensity of, and duration of response, and the extent to which self-regulation modulates the reactivity.

Each method comes with advantages and disadvantages. Parental report, for example, is inexpensive and taps the extensive knowledge of parents who have seen the child in a variety of contexts over a long period of time. However, parents only observe their

Table 1 Dimensions of Temperament

Dimension	*Descriptor*	*Example item*
Fearful Distress	Distress and withdrawal in new situations	"Is afraid of loud noises"
Irritability	Fussiness, anger, frustration	"Gets mad when even mildly criticized"
Positive Emotion/ Approach	Smiling and laugher, cooperative	"Smiles and laughs during play"
Persistence	Duration of orienting toward objects of interest	"When drawing or coloring a book, shows strong concentration"
Activity Level	Amount a child moves	"Tends to run, rather than walk, from room to room"

child's behavior in their own presence, and children may act quite differently when not in the presence of their parents. Parents also may bias their responses because they are worried about making an impression on the researcher. Structured observational assessment, on the other hand, allows the researcher to have precise control over the situation, but is more expensive and constrained in what kinds of behaviors may be elicited and measured.

Temperament is hierarchically organized and thus can be assessed on various levels, including the biological. In addition to considering observed behavioral responses to the environment, individual differences in cardiac reactivity, stress hormone responsivity, and activation patterns in the prefrontal cortex of the brain are considered indicators of temperament. Thus, temperament researchers come from a variety of perspectives, from emphasizing the importance of mothers' perceptions of their child's temperament to considering mutual hemispheric regulation of approach versus withdrawal tendencies.

Temperament is an important concept for human development because of its biological basis, relative continuity across development, relations to important influences such as attachment and parenting, and its predictive power for child and adult adjustment.

GENETIC AND ENVIRONMENTAL INFLUENCES ON TEMPERAMENT

Behavioral genetics studies have underscored the important role genetics play in temperament. Heritability is the extent to which genetic variation is important for variation in a population, and twin study approaches have yielded substantial heritability estimates for infant and childhood temperament. Specifically, genetic effects account for approximately half of the variation in Fearful Distress, Irritability, and Activity Level, and both genetic effects and the shared environment account for variation in Positive Emotion/Approach and Persistence in infants. Aspects of the environment that create differences among people are important for all dimensions. Although genetic influences play a role in temperamental differences among people, these influences do not act in isolation.

RELATIONS WITH ATTACHMENT STYLE, PARENTING, AND FUTURE ADJUSTMENT

Attachment research has established the importance of caregiver sensitivity for infant and child development. Secure attachment indicates that the child can depend on the caregiver and feels safe, leading to increased self-value. The relationship with parents can influence how secure children feel and how they feel about themselves and others, so securely attached children show more positive emotion and less anxiety and have better future relationships with other people. Some studies have found that child temperament predicts behavior during the Strange Situation attachment assessment (a series of parental separations and reunions), but does not predict the attachment classifications of secure or insecure. Mother report of temperamental negative reactivity is modestly associated with attachment security assessing attachment using Q-sort methods (raters sort descriptive statements into categories indicating how typical the descriptions are of the child's behavior). Thus, temperament and attachment are conceptually distinct, yet related to the extent that they both tap children's reactions and coping with stress.

Temperament plays an important role in children's *adjustment*. Fear-prone children are more likely to have anxiety and depression problems at older ages. In one study conducted by Avshalom Caspi and Terrie Moffitt and their colleagues, children who were

distress prone, impulsive, and unregulated as 3-year-olds tended to have more problems such as not getting along with others and getting into trouble with the law as adolescents and adults. They also had few people to provide them with social support as adults. Overall, children high on Fearful Distress are at risk for future mood and anxiety disorders, whereas individuals high on Irritability are at risk for future conduct problems. Those high on Activity Level and low on Persistence are at risk for future attention and hyperactive problems.

SUMMARY

Temperament is at the core of personality, and has a strong influence on responding to the surrounding environment. Although it is biologically based and genes account for a significant amount of the variation in temperament among people, the childrearing environment has a strong impact on temperament. The goodness of fit between a child's temperament and their environment influences future positive or negative adjustment.

—Kathryn S. Lemery

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TERATOGEN

A teratogen is an environmental agent that can adversely affect the unborn child, thus producing a birth defect. Most children are exposed to at least one teratogen while in utero. However, even if there is an exposure, it does not always affect the developing child, and even if there is an effect, it may not present at birth. The impact is dependent on an interaction of multiple factors. Although this is a topic with some uncertainties, there is considerable scientific proof that associates the exposure of teratogens to certain birth defects.

Teratogens include infectious agents, chemicals, and physical or mechanical instruments. Infectious teratogens consist of viruses (e.g., rubella), bacteria (e.g., syphilis), and parasites (e.g., toxoplasmosis). For instance, rubella (German measles) can result in blindness, deafness, brain damage, or heart abnormalities. Chemical exposures can occur through lifestyle choices (e.g., alcohol, smoking, drugs) or exposure to environmental hazards (e.g., environmental chemicals). For example, heavy consumption of alcohol during pregnancy can be harmful to the developing child. In extreme cases, children may be born with fetal alcohol syndrome (FAS). Children with FAS display growth retardation, facial deformities, and in some cases mental retardation. Smoking during pregnancy has been associated with increased rates of spontaneous abortion, lower birth weights, and delayed growth. Prescription, over-the-counter, and illegal drugs can also function as teratogens. For instance, mothers who use cocaine during their pregnancy are more likely to have children with lower birth weights. Physical or mechanical agents include radiation (e.g., X-rays). Exposure to radiation from X-rays may alter the genetic makeup of the unborn child.

The teratogenicity, or nature and extent of harm to the fetus, is influenced by fetal genetic vulnerability, type and amount of teratogen, and timing of the exposure during pregnancy. Fetal genetic vulnerability refers to the genetic differences in both the mother and unborn child that can influence the type and severity of effect. This includes differences in placental transport, absorption, metabolism, and distribution of the agent. For instance, an exposure to a teratogen may not result in harm if the mother's metabolism can quickly remove the substance. Teratogenicity is also influenced by the type and amount of exposure.

For instance, a teratogen may be harmless until it reaches a certain level. Once it exceeds that level (dose threshold), it is more likely to result in harm. Also, certain teratogens may have adverse effects only during critical periods of prenatal development. Prenatal development occurs in three phases: germinal, embryonic, and fetal. Each period is characterized by differing developmental changes. The germinal period is characterized by systematic cell division. Differentiation and development of the major organs and body systems occur during the embryonic period whereas organs become more differentiated and operational during the fetal period. As a result of the changes occurring during prenatal development, a certain teratogen may have a minimal impact at one point in time, and a detrimental effect at a different time in development. In general, teratogens have minimal impact during the germinal stage because the developing child is not yet connected to the mother's body. However, just 2 to 3 weeks after conception, the sensitivity to teratogens begins. Major structural harm is more likely to occur during the embryonic period whereas physiological harm and minor structural harm is likely to occur during the fetal period. There are some teratogens (e.g., alcohol) that may adversely affect the developing child at any time during prenatal development.

There are possible exceptions to these principles in which teratogenic exposures may not result in negative effects. There are also agents and conditions with possible, but unproven effects on fetuses. Therefore, it is important to check with a knowledgeable source for possible consequences.

—Deena R. Palenchar

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TESTOSTERONE

Testosterone (T) is produced in the adrenal cortex and ovary of females, but it is made in far greater amounts by the male testis. Castration of humans and animals has long been practiced to prevent fertility and the development of secondary sexual characteristics, cause docility, reduce sex drive, and, in butchered animals, to produce fatter, more tender meat. Castrating a male chick, for example, makes its adult flesh more edible, and the capon fails to develop the rooster's red comb and wattles, does not crow or court hens, and does not fight other cocks. In Asia, eunuchs were presumed to be safe harem guards because of their lack of both interest and ability to copulate. Male sopranos and contraltos, emasculated to maintain their prepubescent voice range, were prominent in the opera and church music of 17th- and 18th-century Europe.

T affects human males importantly but differently at three stages of life: perinatally (in utero and shortly after birth), during puberty, and in adulthood. The fetus begins with undifferentiated sexual parts. A gene on the male chromosome causes the asexual gonads to develop as testes; lacking this gene they become ovaries. The testes then produce T during gestation and for a month or two after birth, causing the external genitalia to form into penis and scrotum rather than clitoris and labia. Internal ducts take the male form, and the central nervous system is masculinized. For the rest of childhood, T stays at low level in both sexes.

Male T rises sharply during puberty, physically converting boys into men. Some T is required for a full repertoire of male sexual behaviors, including libidinous feelings and ejaculation. However, there is no consistent evidence that men with high T are unusually sexy. T is no different in homosexual men than in heterosexuals.

T does not importantly change the male body during adulthood, but the circulating hormone seems to affect sexual and dominance behavior, if not to the degree that is often presumed. The popular belief that men with especially high T are prone to violence or "roid rages" is a myth. A stronger case can be made that elevated T influences men to act in a self-assured, dominant way.

As American men enter middle age, they tend to put on weight, which may be one reason that T declines with age. (T does not lessen in men who maintain constant body fat.) There are similar age

trends for male libido, aggressiveness, and antisocial deviance, all being highest among teenagers and men in their early 20s, then diminishing. However, the causal connection from hormone to behavior has not been demonstrated. Among older men, T level does not correlate with sexuality or frequency of coitus, and older men can perform sex adequately when their hormone levels are barely measurable.

T not only affects behavior but also responds to it. The act of competing for dominant status, as in an athletic contest, affects male T in two ways. First, T rises in the face of a challenge, as if it were an anticipatory response to impending competition. Second, after the competition, T rises in winners and declines in losers. There has been insufficient study to know if similar effects occur in women.

—Allan Mazur

See also Adolescence, Puberty

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THALASSEMIA

The name *thalassemia* corresponds to a specific group of genetic blood disorders. Thalassemia is closely related to the process through which blood is made; hence, before discussing this disorder, it would be helpful to understand a little about how blood is made in our body.

Hemoglobin is an essential component of the "blood making" process as it carries oxygen to the red blood cells. It consists of two different proteins, an alpha and a beta protein. If the body does not produce enough of either of these two proteins, the red blood cells do not form correctly and cannot carry sufficient oxygen throughout the body. This chronic condition results in anemia that begins in early childhood and continues throughout the individual's lifetime.

Thalassemia is not a single disorder but rather a group of related disorders that affect the human body in similar ways. The different forms of thalassemia are outlined below. Individuals who do not produce enough alpha globin protein chains have alpha thalassemia. This disorder is most commonly found in Africa, the Middle East, India, Southeast Asia, southern China, and occasionally the Mediterranean region. As mentioned above, thalassemia is a genetic blood disorder meaning that the transmission of the disorder occurs through genes (from one generation to the next). Alpha globin protein is made by four genes. Depending on how many abnormal genes are inherited, there are four types of alpha thalassemia that range from mild to severe in terms of their effect on the body. An individual that is a *silent carrier* experiences no health problems because the lack of alpha protein is so small that the hemoglobin functions normally. The individual who is diagnosed with *alpha thalassemia trait* has a greater lack of alpha protein that the silent carrier. Patients with this condition have smaller red blood cells and a mild anemia, although many patients do not experience symptoms. The most severe form of alpha thalassemia is *alpha thalassemia major* where there are no alpha genes in the individual's DNA. This lack in alpha protein causes the formation of an abnormal hemoglobin named hemoglobin Barts. Most individuals with this condition die before or shortly after birth. Individuals whose hemoglobin does not produce enough beta protein have beta thalassemia. This form of the disorder is commonly found in people of Mediterranean heritage, and is also found in the Arabian Peninsula, Iran, Africa, Southeast Asia, and southern China. Much like in alpha thalassemia discussed above, there are three types of beta thalassemia that also range from mild to severe in their effect on the human body.

Those diagnosed with *thalassemia trait* have deficiencies in beta protein that are not great enough to cause problems in the normal functioning of the hemoglobin. A person with this condition simply carries the genetic trait for thalassemia and will usually experience no health problems other than a possible mild anemia. In *thalassemia intermedia* the lack of beta protein in the hemoglobin is significant enough to create significant health problems, including moderately severe anemia, bone deformities, and enlargement of the spleen. Patients diagnosed with this condition require blood transfusions to improve the quality of their lives, but do not need blood transfusions to survive. In *thalassemia*

major or *Cooley's anemia,* there is a complete lack of beta protein in the hemoglobin that causes life-threatening anemia. The anemia requires regular blood transfusions and other medical interventions. These extensive and ongoing blood transfusions, which last throughout the life span, usually lead to iron overload, which must be treated with *chelation therapy* (removal of iron from the system) to prevent early death from organ failure. In addition to alpha and beta thalassemia, there are a few other forms of thalassemia that occur less frequently, such as *E beta thalassemia* and *sickle beta thalassemia.*

The main treatment approach for all forms of thalassemia is red blood cell transfusions. These transfusions are necessary and they provide the patient with a temporary healthy supply of red blood cells that are composed of normal hemoglobin and hence are capable of transporting necessary amounts of oxygen to all of the patient's organs. Currently, most patients diagnosed with a major form of thalassemia receive blood transfusions every 2 to 3 weeks to improve their quality of life. However, the resulting iron overload that becomes toxic to tissues and organs, especially the liver and heart, must be treated with chelation. Unfortunately, this treatment can be very difficult, painful, and uncomfortable, and many patients choose to not comply.

Thalassemia can be a devastating genetic blood disorder. In its most severe form, this disease can be fatal. Individuals with severe forms of thalassemia must undergo blood transfusions and chelation therapy to enhance their quality of life and survive.

—Natalie N. Politikos

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THALIDOMIDE

Thalidomide, a drug prescribed for morning sickness in the 1950s, made headlines when it was linked with stunting the growth of fetal limbs. Fifty years later, it was back in the headlines, this time for stunting the growth of tumors. Will thalidomide's tragic past allow the drug to have a future for the treatment of hitherto incurable cancers?

THE PAST

Thalidomide was first synthesized in 1953 by the Swiss company Ciba, who discontinued its development because of apparent lack of pharmacological effects. The white crystalline powder was resynthesized a year later by the German company Chemie Grunenthal when searching for drugs that might be useful for treating epilepsy. Thalidomide was ineffective in that regard, but it was noted that the drug was very effective in causing rapid deep sleep, and the company marketed thalidomide in 1956 as a sedative. It soon became the most widely used sleeping pill in Germany because of its lack of hangover and other side effects. Compared with other sedatives, thalidomide was considered nontoxic and so safe that it was prescribed for morning sickness during pregnancy, a use that led to the tragedy of nearly 12,000 "thalidomide babies" being born with deformed limbs, facial defects, and malformed gastrointestinal tracts. Approximately 40% of the thalidomide babies died within their first year. Strong advocacy groups, including Thalidomide Victims Association of Canada (TVAC), are helping those who have reached adulthood to cope with their severe physical defects.

ANTI-INFLAMMATORY EFFECTS

Although withdrawn 4 years after it entered the market, thalidomide did not completely disappear, due to the serendipitous findings of an Israeli physician, Dr. Jacob Sheskin. He prescribed the drug as a sedative to alleviate painful symptoms associated with erythema nodosum leprosum (ENL), a complication of leprosy, but found that the lesions surprisingly cleared. Its miraculous effects on ENL led to thalidomide being tested in other inflammatory disorders where it has shown usefulness for alleviating symptoms associated with arthritis, inflammatory bowel disease, Crohn's disease, multiple sclerosis, Lupus, and many other auto-immune diseases.

ANTI-CANCER EFFECTS

Following demonstration of its teratogenicity, it was reasoned that if it could cause severe defects to a fetus, thalidomide might also be deleterious to tumors. Early trials of thalidomide as an anti-cancer agent

in the late 1950s did not produce any notable activity, and consideration of thalidomide for the treatment of cancer remained dormant for 40 years. The resurgence of thalidomide for cancer therapy followed from the demonstration in 1994 by Harvard University scientists, led by Dr. Judah Folkman, that the drug could inhibit angiogenesis—the formation of new blood vessels. Since all tumors have a dependency on the production of new blood vessels to grow, drugs that inhibit angiogenesis can potentially be effective for treating cancer. A new era for thalidomide began when it was shown to be extremely successful against an incurable hematological malignancy, multiple myeloma. It is promising also in the treatment of cancers of the prostate, kidney, and some forms of brain tumors, and cancer patients welcome its return to clinical use.

THE FUTURE

The beneficial effects, both in the treatment of cancer and for inflammatory diseases, are extremely compelling for thalidomide's comeback into clinical practice. However, its tragic past still haunts us, and TVAC has asserted that "we will never accept a world with thalidomide in it." To reach a middle ground, pharmaceutical companies have focused on developing related, new compounds that possess some of thalidomide's therapeutic effects but without its teratogenicity. Revlimid, from Celgene Corporation in the United States, is the first of its kind to reach clinical trials for cancer. Perhaps these new generation drugs can push thalidomide into retirement.

—Lai-Ming Ching

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THEORIES OF AGING

For more than 40 years, researchers in gerontology have commented on the need for theories of aging. K. Warner Schaie suggested that theories were needed to integrate the large amount of research data that was accumulating across disciplines. Timothy Salthouse has commented that the field of cognitive aging has virtually no theories that can account for a wide range of phenomena. More recently, Vern Bengtson and colleagues have stated that many gerontology researchers have not focused on theory building, and therefore, the development of theories of aging has not progressed as rapidly as the accumulation of data. Despite this lag in theory building, some theories of aging have emerged that have influenced the conduction of many research studies in aging. The focus of the present chapter is to give an overview of these existing theories in the domains of psychology, sociology, and biology.

According to Bengtson, *theory* can be defined as "the construction of explicit explanations in accounting for empirical findings." In their view, theories of aging can help us understand and explain the normal aging process. More specifically, theories have several functions: (1) integration of knowledge, (2) explanation of knowledge, (3) predictions about what is not yet known or observed, and (4) interventions to improve human conditions. Theories allow integration of knowledge by providing a coherent framework for organizing a large amount of data obtained in empirical studies into a "brief statement that describes linkages among the crucial observations, variables, or theoretical constructs."

One of the most dominant agendas relevant to interventions is the goal of "successful aging," a theme that has guided much research in hopes of identifying the potential of aging and ways to improve the aging process. Indicators of successful aging have been defined in terms of length of life, biological health, mental health, cognitive efficacy, social competence and productivity, personal control, and life satisfaction. To understand how to age successfully and to develop theories accordingly, Paul and Margaret Baltes offered seven propositions about the nature of human aging:

1. *There are major differences between normal, optimal, and sick (pathological) aging.* This proposition suggests that declines produced by dementia and other age-related illnesses are not typical of the normal aging process.

2. *There is much heterogeneity (variability) in aging.* This proposition proposes that the aging process is not uniform; individuals age differently from each other.

3. *There is much latent reserve.* Reserve refers to the idea that we have a *reserve capacity*, or pool of resources that can be activated through learning, exercise, or practice. Older adults do not necessarily use their reserve capacities all the time, but when encouraged to do so, they can benefit to the same degree as young adults on a variety of tasks. For example, older adults benefit from practice with a task.

4. *There is an aging loss near limits of reserve.* Research has shown that performance in older adults declines when the limits of their reserve are reached. For example, older adults are unable to perform at the level of younger adults in tasks involving speed, even under the most optimal conditions.

5. *Knowledge-based pragmatics and technology can offset age-related decline in cognitive mechanics.* Even when the limits of reserve are reached, older adults can *compensate* for age-related declines by using their preexisting knowledge. For example, Salthouse showed that older typists were able to compensate for their slowing in tapping speed by reading farther ahead in the text to be typed, resulting in equivalent or sometimes better typing performance than younger typists.

6. *With aging, the balance between gains and losses becomes less positive.* A gain can be defined as an expected change with age that is desirable, such as becoming more intelligent, whereas a loss is an expected change that is undesirable, such as becoming less healthy. As we age, the ratio of gains to losses is thought to decrease.

7. *The self remains resilient in old age*. Older adults do not hold more negative views about themselves. In fact, older adults do not differ from young adults in reports of life satisfaction, personal control, or self-efficacy.

Several strategies and multidisciplinary theories for successful aging have been developed across fields of study in response to these propositions. One such theory, for example, emphasizes that increasing mental and physical functioning and decreasing the risk of disease and disability by eating healthy and exercising can reduce the occurrence of pathological conditions that disrupt the normal aging process. Additionally, it promotes active engagement with life.

Another theory, selective optimization with compensation, promotes successful aging through planning. Adults should: (1) select activities and abilities that are most important to their sense of well-being and concentrate their efforts on maintaining those abilities, (2) find strategies that will help them optimize performance on the chosen abilities, and (3) find ways to compensate for declines in other abilities.

Another successful aging theory maintains that aging is characterized by loss and decline in many areas. Successful aging is measured by how well older adults adapt to the unavoidable challenges they face as a result of age-related decline. The theory also establishes four tasks that older adults can perform to help them age successfully: (1) find a replacement for the ability that has been lost, (2) attempt to retrain faculties that are declining with age, (3) learn to make do with less, or (4) retain the remaining functioning.

In many respects, aging seems to be an individual process, demonstrating considerable variability between individuals. For example, two 82-year-olds may be very different in terms of health, their ability to live independently, and their cognitive abilities. Keeping the aforementioned multidisciplinary propositions and theories in mind, we turn to theories that can explain more discipline-specific aspects of the aging process: how and why we age the way we do.

PSYCHOLOGICAL THEORIES

Much research has gone into the problems associated with old age, including dementias such as Alzheimer's disease and Parkinson's disease. Large bodies of literature in psychology, medicine, sociology, and other fields focus on aspects of aging for specific groups of individuals (e.g., clinical patients) whose aging experience can be quite different from the norm. Until fairly recently, few researchers concentrated on studying normal, healthy older adults to get a sense of which aspects of our mental states change over time, which remain stable, and how those changes or stabilities manifest themselves in older adults' daily lives.

Cognitive Aging

Cognitive theories of aging attempt to explain the nature of age-related differences in cognition, the factors responsible for these differences, and the mechanisms underlying why age-related differences occur. Although cognitive theories have developed primarily in the past 20 years, several dominant frameworks

have emerged: (1) reduced processing resources, (2) general slowing, (3) inhibition deficits, and (4) transmission deficits.

One theory of cognitive aging proposes reduced processing resources in old age, where a processing resource is defined as some internal input necessary for processing that is available in limited quantities at any given point during processing. A variety of resources required for cognitive processing have been named, including working memory, attention, speed of processing, and inhibition, where the latter two have evolved into their own theories. In a reduced processing resources framework, people have a limited pool of processing resources from which they can draw when performing cognitive tasks, and the amount of available resources decreases as we get older. Therefore, age-related declines in cognitive performance are expected whenever a cognitive task requires more of these resources, e.g., more complex tasks. Consistent with this view, older adults exhibit greater decrements in performance on a variety of complex tasks, such as comprehension of syntactically complex sentences, mental arithmetic, and verbal reasoning.

A second class of theories, theories of general slowing, suggests that a major factor contributing to age-related differences in cognitive functioning is a reduction in older adults' processing speed, or the speed of executing cognitive operations. This age-related slowing occurs in the central nervous system and therefore affects all tasks regardless of complexity. Some researchers have proposed that the rate of slowing in older adults is predictable. For example, some researchers have suggested that young and older adults' processing speeds are linearly related. Others have argued that cognitive processes slow down at a constant rate; more specifically, older adults' processing speed is one and a half times slower than young adults. Although most researchers accept the idea that speed of processing slows with age, there is considerable debate over whether this slowing is the cause of all age differences.

A third cognitive theory of aging proposes that older adults have a deficit in their inhibitory processes: Aging impairs the ability to inhibit or suppress irrelevant information that becomes activated in the course of cognitive processing. Inhibitory processes serve two functions: to prevent irrelevant information from entering working memory (where people hold and manipulate information that is currently being focused on) and to delete information that is no longer relevant to the task at hand. When inhibitory processes are impaired, people will get more interference from irrelevant information because of their inability to suppress it. Inefficient inhibitory mechanisms have been used to explain why older adults are more likely to entertain thoughts that are irrelevant to cognitive processing, such as personally relevant thoughts or daydreams, or why they produce speech that is off-topic when describing events related to their lives.

The fourth cognitive theory of aging uses a connectionist framework where words are represented as nodes that are connected on many levels, including phonology (or sounds), orthography (or spelling), and semantics (or meanings). The Transmission Deficit hypothesis proposes older adults' connections weaken over time by virtue of aging. As a result, any task involving weak connections will be susceptible to age declines. Therefore, older adults are particularly susceptible to cognitive declines when new connection formation is required (as it is for new learning) or when preexisting connections have weakened, as will happen over time when words are not used frequently or recently. Research on older adults' memory, both for tasks involving new learning and for retrieval of infrequently used, existing knowledge, has shown declines, consistent with this theory.

Developmental Theories

Most theories of human development take one of two views of development: the life stage perspective or the life-span perspective.

Life stage perspectives view development as a series of stages through which all people pass in their lives. Progression through the stages occurs in a fixed order, and movement from one stage to another depends on performance in the earlier stage. Generally, later stages are seen as more advanced than earlier stages.

Erik Erikson's theory of psychosocial development, in which development takes place over eight stages, is the most widely known stage theory dealing with older adulthood. Each stage is characterized by two conflicting ways of dealing with life events typically encountered at that stage, called a psychosocial crisis. For example, the period of late adulthood, roughly after age 65, is marked by the struggle between integrity, or looking back on one's life

positively, and despair, or feeling negatively about the life one has led. The adaptive resolution to the crisis is the acceptance that death is relatively near and the ability to review one's life with satisfaction. Successful resolution of this crisis brings with it the development of wisdom. However, this development is a lifelong process, as each psychosocial crisis is never fully resolved.

Daniel Levinson describes life as a series of four 25-year eras, or major life stages. As in Erikson's theory, each era is marked by a general developmental goal, such as becoming independent. However, Levinson's stages are further divided into developmental periods, which are alternately stable and transitional as life goals and circumstances change.

While Erikson's and Levinson's theories characterize the life trajectory as that of a series of stages (e.g., birth, middle age, death) that all humans go through, other theories are more consistent with the life-span developmental perspective. The life-span perspective emphasizes development as the result of a lifelong interaction between a person and his or her environment. In this view, development is composed of growth and decline throughout life, in every area of functioning, caused by many different factors. The rate of growth and decline is quite changeable, and individuals can experience several periods of gains and losses in a single domain, such as cognitive functioning, over a lifetime. Development is affected by the individual's historical, cultural, and social environments as well as by the physical environment, and as such is best understood by drawing on several different fields of knowledge.

The stress process framework proposes a mechanism by which people deal with the life changes associated with old age. It is based on the interaction of stressors, such as undesirable events and/or chronic problems; the moderators, or resources, marshaled to deal with the problems; and the outcomes or net effectiveness of the moderators in dealing with the stressor.

Examples of stressors include the loss or change of a societal role, such as retiring from employment or becoming a widow. Stresses often proliferate, and a primary stressor such as losing a spouse can prompt the occurrence of a secondary stressor, such as financial difficulty. Chronic strains such as illness also function as stressors. Moderators can take the form of internal resources that are rooted in one's personality, such as a preferred coping style or feelings of self-efficacy. Other people, in the form of social support networks, also serve to moderate the effects of stress on older adults. Successful moderators can also bolster people's ability to deal with future stressors, while moderators that are ineffective in dealing with problems can be adapted or discarded.

Similarly, continuity theory posits that people do not deal with stressors in order to resolve a specific developmental challenge, as Erikson argues. Instead, they develop, maintain, and change coping strategies over a lifetime, monitoring their effectiveness and changing strategies to fit each individual situation. Both the stress process framework and continuity theory emphasize the role that individual characteristics play in dealing with stressors, as well as the reciprocal effects stressors and moderators have on each other.

SOCIOLOGICAL THEORIES

In contrast to developmental theories, which focus on age-related change within individuals, sociological theories attempt to explain the relationship of older adults as a group to the rest of society. Most sociological theories tend to emphasize the life course perspective, examining how social norms, including cultural, historical, and familial contexts, influence older adults' social roles and role transitions. The timing of a particular event (e.g., childbearing) in an individual's life and the historical context in which the event occurred are particularly important to the life course perspective.

A social role comprises not only one's personal self-concept but also the ideas held by the rest of society about how a person of a certain status should act. A problem facing most older adults is that of changing roles: from employed to retired, from spouse to widow, from being generally healthy to facing more frequent health problems. According to some researchers, societies have cultural age deadlines or general ages at which people are expected to have completed life milestones, such as marrying, having children, and retiring. Problems arise when these life milestones are completed "off time," or in a drastically different manner from the rest of society.

The role-theory framework focused on the negative changes that came with losing social roles after retirement age and gaining social roles that were less desirable, such as widowed or dependent on others. Studies carried out under this framework found that older adults who were unemployed, widowed, over 70 years

old, or who simply viewed themselves as being elderly or old, were less accepting of old age than their working, married, under 70 years old counterparts who viewed themselves as middle aged. Additionally, when studying personality traits and adjustment to social roles, older adults whose personality incorporated both masculine and feminine traits were more accepting of their age than adults whose traits were strongly masculine or strongly feminine.

Activity theory takes the view that older adults' social needs do not diminish with age, even as the actual amount of social interaction declines. Adults who continue previous as well as new social interactions as they transition into old age will have higher life satisfaction than will adults who are more segregated from the rest of society. Although some studies have supported activity theory, other studies have found that older adults voluntarily decrease the amount of their social involvement for a variety of reasons. Additionally, activity theory does not make predictions about the activity level for adults whose environment changes.

In contrast, disengagement theory posits that older adults naturally withdraw from society as they age, becoming more self-involved and less involved with others. Concurrently, society withdraws from the individual, who is seen to have less to offer with increasing age. Later researchers have argued for differential disengagement, whereby older adults become less involved with some activities, but remain active in other ways. While disengagement theory and activity theory are responsible for generating a considerable amount of research on adjustment in late life, some researchers feel the theories fail to incorporate individual differences and preferences sufficiently to adequately explain social interactions in old age.

Continuity theory is a relatively recent sociological theory. As discussed in the previous section, it posits that older adults seek to maintain a stable environment. This environment can be maintained either externally, by remaining in the same physical and social contexts as in previous years, or internally, by maintaining beliefs, attitudes, and personality traits as in younger years. A mismatch between the desired and actual levels of continuity can be problematic; too little continuity (i.e., too many new experiences) can induce anxiety, while too much continuity can induce boredom with current circumstances.

Another recent theory is the socioenvironmental theory, which emphasizes the effects of one's surroundings on one's social interactions. Older adults are more likely to interact in situations where there are many older adults close by, as opposed to when there are fewer older adults or they are far away. This theory accounts for the popularity of large retirement communities and apartment buildings with large numbers of older adults and has been supported by research findings on friendship patterns in older adults.

Social exchange theory is based on the idea that social interactions are conducted with the understanding that both partners will benefit equally from the contact. Interactions may also be conducted without expecting reciprocity, simply to help another person. In this framework, interactions with older adults would tend to fall under the second category, as society views older adults as having very little to give and much to receive, in terms of assistance, time, and money. Studies conducted with older adults on the amount of aid given to and received from others have found mixed results.

BIOLOGICAL THEORIES

One of the early theories about biological aging was the "wear and tear" theory, or the idea that the body was analogous to a machine. Aging occurred simply because the machine was gradually wearing out. More recently, biological theories of aging have more precisely focused on specific factors that contribute to age-related declines, and these theories can be categorized into two groups: theories that argue that the aging process is largely genetically preprogrammed (although it is an oversimplification, one may think of these as "nature" theories), and theories that hold that the aging process is due to events that occur as a part of everyday life (these can be described as "nurture" theories). One current view, however, takes the approach that aging is due to an interaction of genetic and environmental factors.

While recent physiological aging theories have postulated that our aging process was encoded in our DNA and thus predetermined even before we were born, it is currently thought by some researchers that only 10 to 30% of longevity differences are inherited. Nevertheless, many researchers concentrate their efforts on people who have remained healthy into very old age, studying them and their relatives in an effort to determine what genetic characteristics these older adults share that may contribute to their longevity.

Other researchers believe that aging is due to problems at the cellular level. The *error catastrophe*

hypothesis claims that errors or mutations sometimes occur during the process of transcribing DNA into RNA and RNA into proteins. As the cell divides and multiplies, these errors are passed on, and eventually impair the cell's functioning or lead to cellular death.

Free radical theories are the aging theories with which the general public is most familiar. Free radicals are byproducts of cell metabolism, and they damage other parts of the cell, thus reducing cellular functioning. Free radicals are unpaired electrons, commonly produced during radiation (e.g., sun exposure) or oxygenation. Much research has gone into the use of topical or ingested antioxidants to pair with the free radical's electron, thus rendering them harmless.

Physiological changes in the body's regulatory and immune systems also contribute to physical aging. The immune system becomes less effective with age, as do the body's other systems and organs. However, declines in immune system functioning lead to a decreased ability to detect and fight diseases, making older adults more vulnerable to illnesses such as influenza. Studies have shown that long-lived individuals have well-preserved immune systems.

In addition, the endocrine system has been shown to become less efficient with age at preserving the body's natural balance in areas such as blood sugar levels or hormones. When environmental changes such as lower blood sugar levels occur, the damage is exacerbated by the body's inability to repair the damage and restore balance as quickly as it did when it was younger.

CONCLUSIONS

This chapter has covered only a handful of the theories of aging that have arisen in the past 40 years. While these are the dominant theories, many other theories exist that are in varying stages of development. In addition, theories are constantly being tested and modified in conjunction as new data from aging research emerge. It is only in the last half-century that researchers have begun to focus their attention on older adults as a population worthy of special consideration. While earlier theories of aging were few in number, narrowly focused, and generally negative, recent theories have emerged that establish aging as a multidimensional process. These theories view aging as characterized by positive as well as negative qualities and are more interactive in nature. They emphasize the interaction of biological, physical, and social factors in each individual's age trajectory, and attempt to explain how older adults can minimize the negative and maximize the positive aspects of aging, in order to more fully enjoy the increased life span that comes with living in the 21st century.

—Jennifer H. Stanley and Lise Abrams

See also Older Adulthood

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THEORIES OF DEVELOPMENT

Any one theory of development is an effort to explain complexities of change that occur over the life span, from conception through death. Each tends to represent a different worldview and is based on different fundamental assumptions about the developmental process and can usually be placed into one of the following four categories: biological models, psychoanalytic models, behavioral models, and cognitive developmental models.

THE MATURATIONAL AND BIOLOGICAL MODELS

Arnold Gesell, the foremost maturationalist in developmental psychology, represents a unique approach

to the study of human development. As a physician, Gesell believed that the sequence of development is determined by the biological and evolutionary history of the species. In other words, development of the organism is essentially under the control of biological systems and the process of maturation. Although the environment is of some importance, it acts only in a supportive role and does not provide any impetus for change.

While working with G. Stanley Hall within the tradition of the Darwinian influence that was very popular during the 1920s, Gesell applied the tenets of recapitulation theory to the study of individual development (or ontogenesis). Recapitulation theory states that the development of the species is reflected in the development of the individual. In other words, the child progresses through a series of stages that recount the developmental sequence that characterized the species.

Gesell believed that the most important influences on the growth and development of the human organism were biological directives. He summarized this theory in five distinct principles of development, which he later applied to behavior. All of these principles assume that the formation of structures is necessary before any event outside the organism can have an influence on development. Interestingly, the notion that "function follows structure" was pursued not only by Gesell, but later on, designers, architects, and engineers also found a great deal of truth in these words as well.

Gesell also believed that behavior at different stages of development has different degrees of balance or stability. For example, at 2 years of age, the child's behavior might be characterized by a groping for some type of stability (the so-called terrible twos). Shortly thereafter, however, the child's behavior becomes smooth and consolidated. Gesell believed that development is cyclical in nature, swinging from one extreme to another, and that by means of these swings, the child develops and uses new structures.

Because he placed such a strong emphasis on the importance of biological processes, the majority of Gesell's work and that of his colleagues (most notably Frances Ilg and Louise B. Ames) focused on biological systems as a beginning point to understanding development. Through Gesell's use of cinematic (moving picture) records, stop-action analysis provided the foundation for his extensive descriptions of "normal" development. This technique allowed Gesell to examine the frame-by-frame progression of certain motor tasks from their earliest reflex stage at birth through a system of fully developed and integrated behaviors. For example, his detailed analysis of walking provided the first graphic record of the sequence this complex behavior follows.

Gesell also made significant contributions with the development of the co-twin method for comparing the relative effects of heredity (nature) and environment (nurture) on development. One identical twin would receive specific training in some skill (such as stair climbing), and the other twin would receive no training in the skill. The rationale for this strategy was that because the children had an identical genetic makeup (they were identical twins), any difference in stair-climbing ability must be the result of training. This is the basic paradigm that Gesell used to question some very interesting and controversial statements about the nature of intelligence.

Unquestionably, Gesell's greatest contribution has been to the understanding of the development of the "normal" child. His detailed cinematic records, their analyses, and their translation into books for the popular press have influenced child-rearing patterns in this country as much as that of the famous Dr. Spock (who incorporates many of Gesell's principles into his philosophy).

Gesell's ideas and theoretical approach never entered the mainstream of current thought about developmental psychology. Perhaps this is because much of his work was seen as too biological in nature and not sufficiently theoretical. Both from a historical and applied perspective, however, his contribution was and still is an outstanding one.

Over the last few years, there has been a heightened interest in other maturational approaches, most notably ethology and sociobiology. These views, even more than Gesell's, emphasize the importance of biological and evolutionary principles as determinants of behavior. For example, the primary assumption of sociobiology is that social behavior is somewhat patterned and controlled by an evolutionary-founded need to maintain one's genetic legacy—in effect, to spread ones genetic characteristics onto subsequent generations. Similarly, ethologists talk about innate mechanisms that regulate human behavior and prompt human beings to behave in certain fashions. For example, the disproportionately large eyes that characterize young infants (as is present in many other type of animal young) serve to engage humans in caretaking behavior.

THE PSYCHOANALYTIC MODEL

The psychoanalytic model, developed initially by Sigmund Freud, presents a view of development that is revolutionary in both its content and its implications for the nature of development. The basic assumption of this model is that development consists of dynamic, structural, and sequential components, each influenced by a continuously renewed need for the gratification of basic instincts. How psychic energy (or the energy of life, as it is sometimes called) is channeled through these different components constitutes the basis of the developmental process and individual differences.

The dynamic or economic component of Freud's tripartite system characterizes the human mind (or psyche) as a fluid, energized system that can transfer energy from one part to the other where and when needed. The structural or topographical component of the theory describes the three separate, yet interdependent, psychological structures called the id, ego, and superego and the way in which they regulate behavior. Finally, the sequential or stage component emphasizes a progression from one stage of development to the next, focusing on different zones of bodily sensitivity (such as the mouth) and accompanying psychological and social conflicts.

It is difficult to identify the philosophical roots of psychoanalytic theory, because most psychoanalytic theorists would consider their roots to be in embryology, the biological study of the embryo from conception until the organism can survive on its own. This identification with a biological model has a great deal to do with Freud's training as a physician, his work in neuroanatomy, and his belief that biological needs play a paramount role in development. Some people believe that the philosophical tradition of preformationism (which in its extreme holds that all attitudes and characteristics are formed at birth and only expand in size) is basic to the psychoanalytic model, but this may be untrue. The preformationists stress the lack of malleability of the developing individual, while the psychoanalytic model describes a flexible character for the individual and the potential for change.

Freudian theory places an important emphasis on the resolution of conflicts that have their origin at an unconscious level. It states that the origin of these conflicts is biological and passed on from generation to generation. Development (and the development of individual differences) is an ongoing process of resolving these conflicts.

If the roots of behavior are located in the unconscious, how can they be accessible to study? Through a series of historical accidents, Freud was introduced to hypnotism as a method of treatment. This technique, in turn, gave birth to his now famous method called free association, in which individuals are encouraged to freely associate anything that comes to mind in response to certain words or phrases. Freud believed that such an exposition of underlying needs and fears was the key to understanding a typical behavior. This method is a highly subjective way to collect information, and a large part of the criticism leveled against Freud and many of his followers was directed at this practice.

The theory itself, however, is based on abstract and subjective judgments, and the fact that the behaviors under study are not easily amenable to scientific verification has caused controversy for years. However, the richness and diversity that Freud brought to a previously stagnant conception of development started a tradition that is healthy and strong even today. Perhaps Freud's most significant accomplishment was the first documentation and systematic organization of a theory of development.

The major impact of the psychoanalytic model and the work of such theorists as Freud and Erik Erikson has undoubtedly been in the study of personality and the treatment of emotional and social disorders. Erikson, unlike Freud, focused mainly on the social rather than the sexual dimension of behavior (hence the psychosocial nature of this approach). The impact and significance of both men's contributions cannot be overstated.

THE BEHAVIORAL MODEL

The behavioral model characterizes a movement that is peculiar to American psychology and distinct from any other theoretical model. The behavioral perspective views development as a function of learning and one that proceeds according to certain laws or principles of learning. Most important, it places the major impetus for growth and development outside of the individual and in the environment, rather than within the organism itself.

The importance placed on the environment varies with specific theories within this general model, but, in all cases, the organism is seen as reactive instead of active.

Within almost every behavioral theory, the assumption is incorporated that behavior is a function

of its consequences. If the consequences of a behavior (such as studying) are good (such as high grades), studying is likely to continue in the future. If they are not good (losing privileges), the behavior (staying out past curfew) will change (perhaps to an earlier hour) or to not going out at all on weekday nights.

The behavioral model makes the laws of learning and the influence of the environment paramount in the developmental process. Through processes such as classical conditioning and imitation, individuals learn what behaviors are most appropriate and lead to adaptive outcomes. Given that this model views development as a learned phenomenon, behaviors can be broken down into their basic elements. This leads people to view the behavioral model perhaps as being "reductionistic."

The behavioral perspective views the newborn child as naive and unlearned. John Locke's notion of tabula rasa best exemplifies the philosophical roots of the behavioral tradition. Literally, tabula rasa means "blank slate." The newborn child is like a blank page waiting to be written on, with only the most fundamental biological reflexes (such as sucking) operative at birth. The organism is malleable, and behavior develops and changes as a result of events or experiences. This is a more open view than the maturationist and psychoanalytic perspectives, because it sees human potential as unlimited by internal factors. Sometimes, however, biological endowment (an internal factor) can limit developmental outcomes, as in the case of genetic diseases or familial retardation. But even in the case of the severely retarded child, a restructuring of the environment can greatly affect basic competencies and caretaking functions such as eating and toilet training.

Given that the emphasis within the behavioral perspective is placed on events that originate in the environment and their effects on the organism, it is no surprise that the variable of primary interest to the behaviorist is the frequency or number of times a behavior occurs. For example, if one is interested in studying an aspect of sibling interaction, behaviors are explicitly defined (or operationalized) and must be objective enough to be reliably measured. Constructs as "nice feelings" would not meet such criteria, but "number of times brother touches friend" would.

Using frequency of behavior, the traditional way of studying development is to examine what effect certain environmental events have on behavior. This is most often done by identifying and observing those events in the environment that control behavior and then, if necessary, manipulating these events to see if the behavior under observation changes. In other words, if a child's speech is delayed, the psychologist might want to observe the events that surround the child's verbalizations when left to run their course. Some intervention wherein the parents are encouraged to respond more directly might be suggested, and then additional observation might be done to see if there is any change. This type of design is frequently used in the area of behavior analysis. It illustrates the way in which the effects of certain contingencies can be isolated and identified.

Most interesting, however (given the behaviorists' deemphasis of biological age or stages of development), is the viewpoint that the sequence of experience is the critical factor in development. In other words, when discussing developmental status, experience—and not age—is the important factor. Although age and experience are somewhat related, age should not be thought of as a determinant (or cause) of behavior but only a correlate (a simultaneous outcome).

A more recently popular approach (within the last 50 years or so) to understanding development is through social learning theory and the work of such people as Robert Sears and Albert Bandura. A social learning theory approach is very much based on the same assumptions of the more traditional behavioral approach. A major difference, however, is that the social learning theory model incorporates ideas such as vicarious (or indirect) reinforcement. Here the individual does not need to directly experience something to actually learn it. This approach still reflects the importance of the environment, while at the same time suggests that individual differences contribute something as well.

The most significant impact this model has had is on the systematic analysis of behavior, on the treatment and management of deviant behaviors, and in educational applications such as programmed instruction.

THE COGNITIVE-DEVELOPMENTAL MODEL

The cognitive-developmental model of human development stresses the individual's active rather than reactive role in the developmental process. The basic assumptions of the model are that:

1. Development occurs in a series of qualitatively distinct stages.
2. These stages always follow the same sequence, but do not necessarily occur at the same times for all individuals.
3. These stages are hierarchically organized such that a later stage subsumes the characteristics of an earlier one.

Another characteristic of the cognitive-developmental model that sets it apart from other theoretical models is the presence of psychological structures and the way in which changes in these underlying structures are reflected in overt changes in behavior. The form these changes take depends on the individual's developmental level. Many people categorize the cognitive-developmental perspective as an "interactionist" model because it encourages one to view development as an interaction between the organism and the environment.

The philosophical roots of this perspective are found in the predeterminist approach, which views development as a "process of qualitative differentiation or evolution of form." Jean-Jacques Rousseau, the noted 18th-century French philosopher, wrote that development consists of a sequence of orderly stages that are internally regulated, and that the individual is transformed from one into the other. Although Rousseau believed that the child is innately good (and most of the early predeterminists believed that the environment plays a very limited role), modern cognitive-developmental theorists would not tacitly accept such a broad assumption.

Although the environment is decisive in determining the content of these stages, the important biological or organismic contribution is the development of structures within which this content can operate. For example, all human beings are born with some innate capacity to develop language and to imitate behavior. Human beings are not, however, born with a capacity to speak a specific language, or even to imitate particular behavior. Children born in the United States with French-speaking parents would certainly not be expected to speak French (or any other language) without exposure to that language. Within the organismic model the capacity for development emerges as part of the developmental process. Although the environment is an important and influential factor, the biological contribution is far more important because it is the impetus for further growth and development. The sequence and process of development are predetermined, but the actual content of behavior within these stages is not.

Of primary interest to the cognitive-developmental psychologist is the sequence of stages and the process of transition from one stage to the next. It is for this reason that the set of stage-related behaviors and their correlates across such dimensions as cognitive or social development have been the focus of study. For example, a psychologist might be interested in examining how children of different ages (and presumably different developmental stages) solve a similar type of problem. After observing many children of different ages, the psychologist can then postulate the existence of different types of underlying structures responsible for the strategies children use.

A great deal of Jean Piaget's work has been directed at a better understanding of the thinking process that children at different developmental levels use to solve problems. In fact, much of the Piagetian tradition emphasizes that these different ways of solving problems reflect, in general, different ways of seeing the world.

Considering the cognitive-developmental psychologist's interest in the concept and use of stages, it is not surprising that the primary method used to study behavior is through the presentation of problems that emphasize differences in structural organization. The infant might depend on purely sensory information (such as touch or smell) to distinguish between different classes of objects, yet the older child might place a group of objects in categories based on more abstract criteria, such as "these are all toys, and these are food." The "how" of development is seen to be reflected in the strategies that children use at qualitatively different developmental levels to solve certain types of problems. More important, however, psychologists focus their attention on *why* these differences are present. Such studies have resulted in a model that hypothesizes that different underlying structures are operative at different stages.

Undoubtedly, the cognitive-developmental theorist has had the greatest impact in the different areas of education. Since much of the research conducted over the past 50 years by these theorists has focused on the general area of "thinking," this may be no surprise. Basically, the educational philosophy and practices that have resulted from this theoretical perspective have emphasized the unique contribution that children make to their own learning through discovery and experience. The child is allowed to explore within an environment that is challenging enough to facilitate development within the child's current stage of development, and one that is not boring.

—Neil J. Salkind

See also Cognitive Development, Maturation, Physical Development and Growth

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THEORY OF MIND

Like all social animals, human children develop in a complicated social world, filled with numerous events involving the actions of other social agents. The ability to reason about the behaviors of these social agents is one of the most essential tasks in all of human cognition. For this reason, the question of how children come to reason about their social world has been a hot topic in the field of developmental psychology for some time. Much of this developmental work surrounds the question of how and when children develop a *theory of mind*. A theory of mind (ToM) can be defined as the capacity to represent the mental states—the beliefs, thoughts, perceptions, desires, and intentions—of oneself and others. The term "theory of mind" was originally coined by Premack and Woodruff, who examined whether a chimpanzee was able to reason about the intentions of others. Their original study of ToM in chimpanzees sparked a flurry of interest in the development of these capacities in humans.

Beginning in the 1980s, developmental psychologists devoted considerable empirical effort to the question of how and when children develop an understanding of one aspect of the mind of others: the ability to represent *beliefs*. This work led to the now classic test of belief understanding known as the "false belief task." In this type of task, children are asked to predict what another individual believes about an event in situations where that individual's belief differs from their own. In one version, children are asked what they think is inside a box of Smarties candy. Most participants answer that they think Smarties candy is inside the Smarties box. The experimenter then reveals that the participant is wrong; something unexpected (e.g., pencils) is actually inside the box. The experimenter then asks children what another person who has not looked inside the box will think is inside. Children 4 years of age and older correctly respond that another person will have a false belief about the contents of the box; a person who has not yet looked in the box will mistakenly think that there are Smarties inside. Children younger than 4 years of age, however, answer that another person will think that pencils are inside the box; they incorrectly reason that other people will have the same belief about the contents of the box as they do.

These data and others suggest that children undergo a developmental shift in their ability to represent the false beliefs of others sometime between 3 and 4 years of age. The exact nature of this developmental change, however, is still the subject of much debate in the field of cognitive development. Some researchers have argued that children learn to represent the beliefs of others through the development of simulation mechanisms, techniques for imagining the mental states of others (see Harris, 1991, for a version of this so-called simulation theory). Others have advanced the view that children's developing knowledge of beliefs emerges through a process of conceptual change, much like process of theory change in science. Still others champion the view that children's developmental shift in representing beliefs results from the emergence of innate structures for reasoning about the minds of other.

More recent work on the development of ToM abilities has focused on the question of when children come to understand mental states other than beliefs. This newer work suggests that children successfully represent mental states such as *desires* and *intentions* long before they pass false belief tests; even infants seem to think of the actions of others in terms of goals and intentions. Before the first year of life, infants expect human hands and other agents to move in goal-directed ways. Similarly, 18-month-olds correctly reason about the intention behind an unsuccessful action; when shown an action that an adult attempts but fails, such as trying to hang a loop on a metal prong, infants typically imitate the intended action, even though they have never directly witnessed this action. Infants also use their expectation that humans act in goal-directed ways when acquiring other knowledge, such as the meaning of words. Similarly, infants recognize that adults have *perceptions*, and pay specific attention to where other individuals are looking when reasoning about action. For example, 14-month-olds expect human adults to act on objects at which they are looking. Infants of this age also use information about where human experimenters are looking when inferring the referent of a new word and the meaning of a negative emotional expression.

Although most work in theory of mind has focused on human children, comparative psychologists have also investigated whether nonhuman animals—particularly primates—share out mind-reading capacities. Much of the classic work on this subject has suggested that nonhuman primates know little about the mental states of others. Chimpanzees, for example, typically fail to take into account what human experimenters see and know when choosing whom to ask for food. More recent evidence using different paradigms has indicated that chimpanzees may know about what other individuals see and know in the context of competition. As is the case with work on the development of ToM, these new primate studies continue to be the subject of much controversy and debate in the field.

—Laurie R. Santos

See also Cognitive Development

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TODDLERHOOD

Toddlerhood typically begins around the first birthday and extends to the end of the third year. During this time, the crawling, babbling infant who was dependent on others to meet basic needs emerges into a walking, talking, and increasingly autonomous preschooler. The developmental accomplishments of the toddler period are often considered to be among the most profound that occur during the life course. The physical, cognitive-linguistic, and social-emotional abilities that first appear during this phase of development provide a foundation for later learning and relating to others.

PHYSICAL DEVELOPMENT

The word *toddler* is derived from "toddle," which means "to walk with short unsteady steps." To be sure, walking is a major accomplishment of this period. The child's first steps, which typically emerge around the first birthday (with the normal range of development between 9 and 17 months), mark the beginning of toddlerhood. At first, the child toddles with legs wide apart, toes pointed outward, and arms raised for balance. Toddlers quickly become adept at this new skill and will engage in more mature walking patterns within 6 months of their first steps. Once walking forward (and backward, at a slightly later age) is mastered, toddlers develop other large motor skills including running, jumping, and climbing. Ask any caregiver of a toddler and you will hear that toddlers are busy people!

Perhaps less striking, although equally important, toddlers also develop greater fine motor coordination, especially with respect to hand and finger skills. Younger toddlers, for instance, become adept at using their thumbs and forefingers to manipulate small objects, hold a spoon, scribble, or stack blocks. Older toddlers will further hone these hand and finger skills, and by the end of toddlerhood, children are able to draw, turn pages of a book, dress and undress themselves, and use a cup single-handedly.

A great challenge to caregivers of toddlers is providing opportunities to practice and polish emerging motor skills, while keeping the toddler safe. Caregivers may facilitate physical development by providing large, soft materials (e.g., pillows, mats, foam blocks) and toddler-sized climbing and sliding equipment that permit toddlers to play safely. Additionally, the availability of blocks, stacking toys, crayons, paints, and puzzles will help to stimulate and foster fine motor skills. Of course, boys and girls alike should have opportunities to engage in a variety of large-motor and fine-motor activities—from playing run-and-chase games or wrestling on the floor to sitting quietly while coloring or turning pages of books.

COGNITIVE-LINGUISTIC DEVELOPMENT

The large motor skills achieved by toddlers in the second year (especially walking upright) allow the child to view the world from a whole new perspective, and the increasing fine motor skills enable the toddler to manipulate and explore objects in ways that were not possible during infancy. Jean Piaget (1896–1980), a Swiss philosopher and psychologist, proposed that children actively construct knowledge about the world. Infants, for instance, learn about objects through the coordination of their senses and motor abilities (e.g., seeing a toy and reaching for it). Piaget labeled this phase the sensorimotor stage of cognitive development. Between 18 and 24 months, toddlers gain the capacity for symbolic thought, which marks the beginning of Piaget's preoperational stage of cognitive development. This newfound ability for symbolic mental representation is reflected in toddlers' ability to imitate actions that they've observed in the past, engage in pretend play, think about what they will do before doing it, and use language.

Indeed, toddlers' rapid gains in receptive and expressive language abilities mark one of the most dramatic changes of this period. Receptive language (i.e., the child's understanding of what others say) emerges before expressive language, and by 24 months most toddlers can understand names of familiar people and objects, point to named objects or pictures, and follow simple commands. These skills further develop between 24 and 36 months, with the ability to follow two-step commands and understand full sentences. Clearly, toddlers also make impressive gains in expressive language (i.e., the ability to put thoughts into words). Between 12 and 15 months of age, toddlers typically say their first words, and by 24 months most toddlers will have a 50-word vocabulary and use two-word sentences and questions (e.g., "more juice," "what that?"). Such utterances are called telegraphic speech because they resemble the abbreviated messages found in telegrams. By the end of the toddler period, children will use complete sentences and basic rules of grammar (e.g., adding "-ed" to the end of verbs to indicate past tense) and will have a 200-plus-word vocabulary.

Caregivers can promote toddlers' cognitive and language development in numerous ways, including naming objects, talking about events that happen throughout the day, reading picture books, and singing. Through these experiences, toddlers not only build strong vocabularies but learn correct grammar and social conventions of language, such as turn-taking in conversations. Having a variety of play materials available that encourage hands-on sensory exploration (e.g., Play-Doh, sand or water tables, paints) and pretend play props that encourage imaginative play (e.g., dress up clothes, cars and trains, dolls) will also help toddlers make full use of their new cognitive abilities and interests.

SOCIAL-EMOTIONAL DEVELOPMENT

Toward the end of the second year, as the capacity for forming mental representations emerges, toddlers develop a sense of an independent self. Signs of this budding sense of self can be found in the toddler's self-references ("Me do it!"), the ability to recognize his/her own image in the mirror, and the increasing likelihood to meet parental requests with an emphatic "NO!" Erik Erickson (1902–1994), a developmental psychologist who proposed a life span theory of psychosocial development, considered achieving a sense of autonomy to be a key task of the toddler period. Toddlers who have the opportunity to engage in self-help skills (e.g., feeding and dressing themselves) and make simple decisions tend to develop an autonomous sense of self. When caregivers do not permit toddlers to make simple choices or do things for themselves, or consistently reject bids for autonomy, the toddler's sense of personal agency may become riddled by feelings of shame and doubt. Importantly, the toddler may swing sharply between striving for autonomy and clinging to caregivers, especially when tired, ill, or afraid. This mixed desire for independence, on one hand, and the security of the caregiver's lap, on the other, is a central tension of toddlerhood. In this sense, the toddler period has been referred to as the "first adolescence."

In conjunction with an emerging sense of self, toddlers demonstrate a growing awareness of and interest in others, especially other children. Toddlers in the second year of life will typically play side by side with little or no interaction. Throughout the third year, though, toddlers will show increasing ability to interact with peers and these interactions often stem from toddlers' propensity to imitate others. Two-year-olds are also able to distinguish among playmates and may develop playmate preferences. Thus, peer interactions in the toddler years pave the way for the advent of friendships in the preschool years.

Finally, as the toddler develops a sense of self as separate from others, new emotions emerge that were not present during infancy. For instance, toddlers are

openly affectionate and show signs of empathy and concern toward others' injuries or distress. Toddlers also show positive self-evaluations (a precursor to pride) when accomplishing a goal and shame when behaving in a socially unacceptable or prohibited manner. These emotions are often labeled "social" or "self-conscious" emotions because they reflect feelings about the self in relation to others. As a result of increasing awareness of the social rules for appropriate behavior and the emotions that may accompany such awareness, toddlers may begin to develop a sense of a "moral self."

Given the toddler's frequent demands to "have it all" and the "clash of wills" that may result when the goals of the parent oppose those of the toddler, it is no wonder that the toddler years are challenging for parents and children alike. Older toddlers, in particular, are famous for their increased negativity, thus the label the "terrible twos." Yet, such negativism reflects the child's increasing wish for autonomy and is a normal part of toddler development, especially in Western cultures. Caregivers can promote a positive sense of self by respecting the toddler's need for autonomy. At the same time, when the toddler seeks the caregiver's comfort or protection, it is important to provide reassurance that support is available. By the end of this period, children who have learned that caregivers are available and responsive when needed will be more secure and independent than children who have been "pushed" toward independence. In light of the increasing physical and cognitive capacities of the growing toddler, caregivers tend to first establish rules for behavior during this period. Caregivers should strive to consistently hold to a clear set of rules that serve the safety and well-being of toddlers and others around them. Providing simple reasons for rules may also foster toddlers' understanding of others' feelings and perspectives. Remarkable physical, social-emotional, and cognitive-linguistic growth mark the toddler years, and it is likely that children will benefit when caregivers are responsive to the toddlers' need to "do it myself," provide safe and simple choices, and keep an open mind and sense of humor during these busy times!

—Nancy L. McElwain

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TOILET TRAINING

Toilet training is an important developmental milestone in every child's life. Although toilet training is universal, variation exists in everything from the timing to the method of the training. Cultural and societal norms have a significant influence on the practice of toilet training. In the United States, the suggested age of initiating toilet training has ranged from 1 month to 24 months of age. In other industrialized societies, recommendations for the timing of training vary widely, as well. Children have been thought to be "ready" at approximately 5 months in London, 8 months in Paris, and just over 1 year in Stockholm.

The variation in beliefs about readiness may be related to the methods used and attitudes toward toilet training. In some cultures, the responsibility for toilet training falls primarily on the child's caregiver. For example, in the Digo tribe in East Africa, caregivers are trained to recognize and tend to a child's need to urinate or defecate. Children are expected to attain complete dryness by 1 year of age. In contrast, in the United States and other Western societies, the responsibility is placed largely on the child to be independent and therefore dryness is achieved at a much later age.

Despite all the disparity in beliefs and practices related to the timing of toilet training, research indicates that most children are successfully trained by 24 to 36 months of age, with nearly all children being trained by the age of 4. One factor contributing to successful training is the child's level of physical and intellectual maturity. Physical readiness includes a fairly regular pattern of wetting during the day that occurs less frequently (e.g., 4 times per day). Also it is helpful if the child has developed the level of physical dexterity needed to raise and lower his or her pants quickly. Thirdly, the child needs to both understand and be able to convey concepts such as *wet, dry,* and *potty*. Finally, for toilet training to be successful and

efficient, a child must be able to comply with simple requests given by the parent. All of these "prerequisites" signal that a child is likely to be effectively trained. Given the readiness criteria, it is not surprising that the later training is initiated, the faster dryness is accomplished. For example, children who begin toilet training at 26 months or later tend to be successfully trained twice as fast as those whose training begins before 24 months.

As the differences are great regarding the age of initiating toilet training, opinions about the method of toilet training are equally wide-ranging. Over the years, the prevalent thinking regarding toilet training in the United States has varied between gentle child-centered approaches and intense prescribed methods designed for rapid training in as little as 4 hours. Many diverse techniques and strategies are included in training methods such as the use of scheduled toilet sits, charts, rewards, books, and dolls to assist the child's learning. Despite their differences, varying methods appear to have similar rates of success, given that approximately 90% of children are successfully trained by age 4.

Although toilet training is typically achieved by the age of 4, it is not uncommon for accidents to occasionally occur in children of 3 to 6 years of age. Typical accidents occur when children are intently involved in play activities. Professional guidance is rarely needed in these cases. However, up to 25% of boys and 15% of girls have persistent problems with wetting the bed or their pants. Additionally, from 1.5 to 5% of children have difficulty with soiling or defecating in their pants. These persistent concerns can be effectively treated, but may warrant professional assistance from a physician and/or psychologist.

—Eve A. Herrera

See also Parent-Child Relationships, Parenting

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TOUCH

Touch typically refers to sensations that occur when skin receptors are triggered by external stimuli. Touch has been described as one of the most fundamental means of contact with the world and the simplest and most straightforward of all sensory systems. It is the first sense to develop in utero and by 14 weeks after gestation, the surface of the fetus is almost entirely sensitive to tactile stimulation. By adulthood, the skin constitutes the largest organ of the body, covering 1.8 square meters of the average person.

The importance of touch has been implicated in several domains of life across the life span, particularly in early life. Touch helps us learn about the world around us and plays an integral role in biological, cognitive, and social development. Below, each of these domains is described along with the physiological underpinnings and physical dimensions of touch that help make it such a rich and important modality in life.

THE PHYSIOLOGICAL UNDERPINNINGS AND PHYSICAL DIMENSIONS OF TOUCH

As mentioned, the skin is the largest organ of the human body and weighs between six and ten pounds. The skin is a multilayered structure containing several receptors, each of which sends unique signals to the brain via neurons via the spinal cord. Information from the spinal cord enters the thalamus—the "relay station" of the brain—and input from there is sent to a strip of the brain called the somatosensory cortex located on the parietal cortex. The more area on the somatosensory cortex that is dedicated to a given area of skin on the body, the more sensitive that area of skin is to tactile stimulation. Thus, areas of the body such as the fingers and lips—two of the most sensitive areas of the body to tactile stimulation—are well represented on the somatosenory cortex compared to less sensitive areas of the skin such as the back.

When considering the impact of touch, one must consider not only the physiological underpinnings of the modality but the physical dimensions of tactile stimulation on the skin. The dimensions of touch can be divided by the *qualities* of touch (the actual tactile stimulus that is administered) and the *parameters* of touch (where and how much touch is administered). The following constitute the qualities and parameters of touch:

Qualities

- Action: the specific movements on the skin (e.g., stroking, squeezing)
- Intensity: the degree of pressure on the skin
- Velocity: the rate at which something is impressed upon or across the skin
- Abruptness: the acceleration or deceleration that the skin is touched
- Temperature: the temperature of the tactile stimulus on the skin

Parameters

- Location: where the tactile stimulus is on the skin
- Frequency: the number of times that the skin is touched
- Duration: the elapsed time that the skin is touched
- Extent of surface area touched: the amount of surface area that is covered

Together, these dimensions of touch comprise the richness of the tactile modality.

LEARNING ABOUT THE WORLD VIA TOUCH

Throughout life we actively explore the world with our hands to learn about objects in the world—a process known as haptic perception. Haptic perception, in conjunction with vision, is particularly important for infants to learn about the world. Research indicates that by 3 months of age infants can distinguish objects by size and shape (e.g., a cube from a hollow square), by 6 months of age they can distinguish objects by hardness and texture, by 9 months of age they can distinguish objects by weight, and by 15 months of age they can distinguish between shapes that are similar in features but differ in spatial arrangement.

EFFECTS OF TOUCH ON BIOLOGY

Touch plays an instrumental role in brain development and growth, especially in early life. Without adequate tactile stimulation early in life, the brain does not grow to a normal size and the synapses between neurons do not develop properly. In addition, adequate tactile stimulation early in life can buffer the effects of tactile deprivation later in life. Thus, exposure to adequate amounts of touch early in life seems to form a foundation for later nervous system development.

The importance of touch does not wane later in life. Research indicates that when nonhuman animals are provided extra tactile stimulation later in life, their brains increase in size and the synapses between neurons increase. Moreover, tactile stimulation can help stimulate neuronal growth due to brain lesions and infarcts in the brain later in life.

In addition to studying the effects of touch on the brain, researchers have investigated the effects of touch on premature infants' growth. In one study a group of premature infants received a 10-day protocol of massage therapy comprised of tactile/kinesthetic stimulation while a control group did not receive the massage therapy protocol. Compared to the control group, the treatment group gained 47% more weight, was more active and alert, and spent 6 fewer days in the hospital. If all of the premature infants in the country received massage therapy, an estimated total of $4.7 million would be saved in medical costs annually.

Massage therapy improves a host of other biological and health related phenomena. Children and adults receiving massage therapy experience less anxiety, lower levels of stress hormones (cortisol, norepinephrine, and epinephrine), enhanced immune system functioning, and heightened alertness as indexed by EEG. Massage therapy can also play a role in the treatment of several medical conditions including juvenile rheumatoid arthritis, fibromyalgia, chronic lower back pain, migraine headaches, depression, autism, attention deficit hyperactivity disorder, posttraumatic stress disorder, and some eating disorders.

EFFECTS OF TOUCH ON COGNITION

Touch has a significant impact on cognitive development. A wide body of literature suggests that cognitive development is intimately tied to brain development in the childhood years and, as mentioned, touch plays a pivotal role in neuronal development in the early years of life. Parental aversions to touch as well as harsh touch have been implicated as factors in the development of language and learning disorders. In addition, research suggests that parents who use touch to stimulate the central nervous system

regularly and appropriately have children that are more likely to develop an accurate and sophisticated body image. These parents provide a variety of forms of tactile stimulation to a number of areas on the body.

EFFECTS OF TOUCH ON EMOTION AND SOCIAL INTERACTION

Touch plays an integral role in the caregiver-child relationship from the beginning of life. In one U.S. sample, infants were touched for 33% to 61% of the time during brief interactions with their mothers. The frequency of contact is much higher in some cultures such as the !Kung and the Efe tribe of Zaire where mothers spend approximately 75% of the time in contact with their infants.

In infancy, caregivers' touch is thought to serve a variety of communicative functions while they are in contact with their infants. Two of the most important are the communication of emotions, as well as the communication of security. A number of studies indicates that touch is capable of communicating and eliciting positive and negative emotions. One powerful demonstration of the power of touch to elicit positive emotions has been shown when researchers use the "still-face paradigm" to study infant emotionality. The still-face paradigm is comprised of a period of interaction when the caregiver assumes a still-face, thereby not responding to the infant's actions. During this period, infants typically react negatively because this is an unusual event in most infants' lives. Several studies indicate that if caregivers touch their infants during the still-face period, their infants' emotional displays are significantly less negative and more positive compared to infants who are not touched during the still-face period.

The quality of caregiver-infant touch is a central feature of the responsive and available caregiving environment that is necessary to foster an infant's sense of security. Several studies suggest that touch between the caregiver and infant is the "ultimate signal" of security of the infant. In one experimental study, researchers compared how infants were attached to their caregivers when they carried their infants ventrally in soft infant carriers versus those who were carried in harder infant seats. The researchers found that infants carried in the soft infant carriers were significantly more likely to be securely attached to their caregivers than infants who were carried in the infant seats. This study and others strongly suggest that touch plays a key role in the communication of security to children.

Touch continues to play an integral role in social communication in adulthood. For example, touch communicates power and emotions to others, as well as aids in persuading others to comply with our requests. In addition, touch increases verbal interaction among people, gains attention from others, and communicates our attraction toward others.

In sum, touch not only helps us learn about the world in which we live but plays an integral role in several other domains of life including biological, cognitive, and social development. Although touch may be one of the most powerful and most important sensory modalities across the life span, the study of touch has remained minimal. Future work on touch will continue to unravel the mysteries of touch.

—Matthew J. Hertenstein

See also Sensory Development

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TOURETTE'S SYNDROME

Tourette's syndrome (TS) is a neurobehavioral disorder named after the French neurologist Georges Gilles de la Tourette who in 1885 described nine patients with TS symptoms including verbal and motor childhood-onset tics and other behavioral problems including poor impulse control and obsessive-compulsive behaviors. The disease, once believed to be extremely rare, is now considered to be quite

common, affecting approximately 2% percent of the population. The disease afflicts males 5 times more often than females. The onset of TS, as characterized by the emergence of motor and vocal tics, typically emerges between the ages of 3 and 8 with a reduction in these symptoms occurring by age 20.

SYMPTOMS

The hallmarks of TS are the motor and verbal tics. These tics vary in complexity, duration (ranging from 1 year to lifelong), intensity (from mild to severe), and frequency (from rare to constant). Tics are brief movements or sounds that appear unpredictably. They emerge individually or in choreographed clusters and can be expressed either intermittently or continuously for hours. These tics fall into one of several categories: (1) motor tics which can include intense eye blinking, throat clearing, and neck and arm twitching; (2) phonic tics such as repeated utterance of a particular word, shouting (obscenities), or grunting; (3) aggressive phenomenon such as self-injury, hitting, kicking, or biting self or others; and (4) compulsive behaviors that may include hand-washing, door locking, checking and organizing objects, and touching or tapping others and objects.

The motor and phonic symptoms typically wax and wane. This waxing and waning is most likely influenced by ongoing brain developmental changes and environmental influences such as stress. Additionally, medications for TS can also cause changes in the brain that result in corresponding behavioral changes. The repertoire and severity of symptoms of TS patients, therefore, require constant monitoring by the patient and family, as well as by the physician who will adjust the dose and type of medication accordingly. Studies have reported that the highest incidence and severity of tics occur with anticipation or resolution of emotional changes. Consistent with this, stress, anxiety, and fatigue exacerbate tics, and ironically, the very urge and attempt to control the tic can itself lead to additional stress and anxiety. Altogether, the disease and its consequences can often lead to problems in school performance and self-esteem, and also in a variety of social and behavioral problems at school, at home, and in society in general.

GENETICS

Tourette's syndrome has a significant genetic component. Several genes have been identified through family studies, segregation analyses, candidate gene studies, and linkage studies. TS inheritance may involve several mechanisms including autosomal dominant, bilinear, or polygenic mechanisms. Candidate genes for TS pose a genetic susceptibility with such factors as pre- or postnatal stress, and other environmental factors such as viral infections or stress, increasing their likelihood of expression. It is critical therefore to continue studies designed to identify specific gene-environmental interactions. The candidate genes identified thus far appear to be involved in the regulation of brain development and neurochemical signaling. For example, several dopamine (DA) receptor (D1, D2, D4, D5) and noradrenergic receptor (ADRA2a, ADRA2c and DBH) genes and a few serotonin genes have been identified. In conclusion, many candidate genes that pose a susceptibility to developing TS have been identified. The heterogeneity of identified TS genes together with their varying etiologies and environmental interactions make it impossible to provide a single or simple explanation for the etiology of TS. Research progress in this area will lead to a better understanding and predictability of the etiology of TS and improved treatments for these patients.

NEUROBIOLOGY

Numerous neuroanatomical and brain imaging (fMRI, PET, SPECT) studies have identified the prefrontal cortex (PFC)–basal ganglia (BG) circuit as the major system involved in Tourette's syndrome. This circuit is involved primarily in regulating a variety of motor, limbic, and cognitive functions. The dorsal striatum (consisting of the caudate and putamen) of the BG is implicated primarily in motor control and habit formation, whereas the ventral striatum is implicated in compulsivity and addiction. The prefrontal cortex is involved in such higher-order executive decisions as impulse control. Other related areas such as the brain stem, which has been implicated in eye blink reflex, have also been implicated as well as other areas that interact with the PFC-BG circuit including motor, cingulate, temporal, and parietal cortical areas, Broca's area, thalamus, and cerebellum.

The overriding problem in TS appears to be the overactivity of motor and motivational/reinforcement systems with an inability of the prefrontal cortex to override or inhibit those related behaviors. TS patients, like patients with prefrontal damage, reveal poor performance on impulsivity control tasks. A functional neuroimaging study revealed an increase

in neural activity in the prefrontal and caudate nucleus and a decrease in the motor-related putamen and globus pallidus in a tick suppression task. Performance on tasks requiring other higher-order functions such as learning and memory, however, remained normal in TS patients.

Examination of the specific neuroanatomical abnormality of the prefrontal-BG circuit has revealed a decrease in the volume of these brain areas in TS patients. It remains unclear, however, as to whether these brain differences are necessarily due to damage or due to compensatory mechanisms. The compensatory nature of the brain further suggests that these individuals may develop alternative cognitive and behavioral strengths that are not dependent on the damaged brain areas. Special efforts should be made by the family, educators, and physicians to help the patient identify such strengths and talents.

Detailed synaptic and receptor microcircuitry abnormalities within the PFC-BG circuits, however, have not been fully explored. The identification of specific cellular and biochemical circuits will help to improve site-specific targeted treatments for this disorder. For example, striatal cholinergic neurons of the striatum are known to signal reward and in turn influence motor signaling as well as incoming prefrontal cortical signals. Dr. Alcantara's work has implicated these neurons and their corresponding dopamine D2 receptors to play a key role in the development of drug abuse and possibly in the treatments designed to treat addiction. Further investigations should examine whether these cholinergic neurons are also critical for motor and impulse control in TS patients.

TS patients express comorbidity with two other PFC-BG related disorders: obsessive-compulsive disorder (OCD) and attention-deficit-hyperactivity disorder (ADHD; which involves increased inattention, hyperactivity, and impulsivity). TS patients also have a high incidence of depression, anxiety, and aggression. Additionally, family members of TS patients show a higher than normal incidence for OCD, ADHD, drug or alcohol dependency, depression, anxiety, eating disorders, and panic disorders, all of which share a common neuroanatomical and biochemical basis with TS.

NEUROTRANSMITTER SYSTEMS

Two neurotransmitter systems most likely affected by TS are the dopaminergic and norepinephrine systems. The dopamine system, central to the PFC-BG circuit, is suggested to be hypofunctional, further implicating the supersensitivity of dopamine D2 receptors and therefore requiring drugs that block these receptors. The norepinephrine (NE) system originating in the brain stem influences motivation, attention, and arousal in the PFC-BG circuit and is also suggested to be hypofunctional, requiring the use of adrenergic (NE) receptor agonists.

TREATMENTS

Pharmacological Treatments

Two classes of antipsychotic drugs that target the DA and NE systems are most widely used. These include the neuroleptics, including fluphenazine, haloperidol, pimozide, sulpiride, and tiapride, which are effective in reducing the symptoms of TS (side effects include sedation or dysphoria). Additionally the alpha2 adrenergic agonists such as clonidine, desipramine, guanfacine, and risperidone often show benefit (side effects include sedation and irritability).

Behavioral Treatments

Behavioral treatment or combined behavioral treatment with drugs is the most effective in treating the symptoms of TS. Cognitive behavior therapy (CBT) is the main behavioral treatment of choice. CBT includes habit reversal, which is the most promising treatment consisting of awareness training, self-monitoring, relaxation training, competing response training, and contingency management. Also hypnotherapy, biofeedback, conductual therapies, acupuncture, electroconvulsive therapy, meditation, and surgery have been employed. Surgery, however, is the most invasive and can lead to subsequent brain circuit deterioration. Both drug and behavioral treatments can target and modify the affected brain areas and related receptor and synaptic microcircuits. These treatments thereby show much promise for the successful long-term treatment of TS. Continued research in the areas of TS and improved animal models should continue to shed light on our understanding of the etiology of TS and the development of improved site-specific targeted behavioral and pharmacological treatments for Tourette's syndrome.

—Adriana A. Alcantara

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TOXOPLASMOSIS

Toxoplasmosis (toxo) is a common parasitic infection that, often completely asymptomatic when acquired by adults, may have serious adverse consequences when transmitted by a pregnant woman to her embryo/fetus. The responsible parasite, t*oxoplasma gondii* occurs worldwide, but infections are more common in warmer climates. Infection generally occurs through eating undercooked meat or unwashed fruit/vegetables or contact with infected cat feces or soil.

ADULT INFECTION

Testing reveals evidence of toxo in many adults. In a minority of normal adults with primary adult infections, symptoms do occur and may include fever, general malaise, and enlargement of lymph nodes. Subsequently, the parasite forms cysts throughout the body which may remain latent for years. Reactivation of the cysts in the eyes of a small percent of affected individuals may cause recurrent vision problems. In adults with severely impaired immune systems, primary toxo infection may have serious consequences, including death. Primary infection generally leads to development of antibodies that protect against reinfection.

PRENATAL/CONGENITAL INFECTION

Major concern with toxo is its potential congenital effects. Toxo is one of several infections that may have serious adverse effects on offspring if primary infection of a pregnant woman is transmitted pre- or perinatally to her embryo/fetus. Such infections are variously called prenatal/perinatal, congenital, or maternal infections. Since newborns affected by these infections share characteristics, identification of the particular agent is often only through laboratory analysis.

Overall probability across pregnancy of congenital infection of the embryo/fetus is about 30%. However, probability of infection is inversely related to duration of gestation: Risk is very low early in pregnancy and only about 6% at 13 weeks, but thereafter rises virtually exponentially to about 80% just before birth.

Congenital toxo can lead to intrauterine growth retardation (IUGR) and, rarely, stillbirth. Many children with congenital toxo are asymptomatic. In those who do show symptoms, the most common is retinochoroiditis. Hydrocephalus, intracranial calcification, mental retardation, and other neurological deficits may also occur. Hearing impairment may develop in childhood. Incidence and severity of adverse effects are inversely related to time in gestation at which infection occurs: Adverse impact is greatest with infection early in pregnancy and diminishes thereafter. Ocular lesions can occur and reoccur at any age, but again, risk appears to diminish with gestation age at time of primary maternal infection. When a toxo infection is identified, which may not be until 12 months of age, antiparasitic agents may be administered.

IDENTIFICATION AND PREVENTION

Since primary *T. gondii* infection leads to subsequent production of antibodies that protect the embryo/fetus from infection, concern is with women who have no antibodies at the beginning of pregnancy. Serological testing can identify women who do not have *T. gondii* antibodies at the outset of pregnancy and retesting can identify development of antibodies, indicating a primary infection. Ultrasound detection of signs such as enlarged cerebral ventricles and intracranial calcification are suggestive of prenatal toxo. Diagnosis can be confirmed through detection of the parasite in amniotic fluid. In cases of maternal or embryonic infection, pregnant women may be treated with antiparasitic agents in an attempt to prevent adverse effects. However, although such identification programs and treatments are common in Europe, their use involves risks to the embryo/fetus, and their effectiveness is controversial. In cases of confirmed diagnosis, the pregnancy may be terminated. See Gilbert (2000) for a detailed discussion.

The best prevention of congenital toxo is for pregnant women to avoid primary infection. Given

that the most severe adverse consequences occur with early prenatal infection, much damage to the embryo may occur if a woman suffers primary *T. gondii* infection before learning she is pregnant. The best prevention is for women who may become pregnant to avoid primary infection by not eating undercooked meat, washing hands and work surfaces after preparing raw meat, washing fruits and vegetables, and avoiding contact with used cat litter or soil that may contain animal feces.

—Robert T. Brown

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TWIN STUDIES

Twin studies represent one of the oldest scientific methods of evaluating the influence of heredity on human development and behavior. During the course of the 20th century, twin studies became more versatile and have encompassed a wider range of behavioral constructs. As the field advanced, debates about whether nurture or nature is more influential have been replaced with the notion of nature *via* nurture. This ideological shift has been driven by an increasing number of twin studies demonstrating that certain environments in combination with genetic influences produce a particular developmental outcome. What follows is a brief overview of the twin study method and applications of the method that have led to discoveries in human development.

BEHAVIORAL GENETICS AND THE TWIN STUDY METHOD

Behavioral genetics is the study of the influence of genes and environment on variation in human behavior. In traditional non-twin family study designs, genetic and environmental influences are confounded with each other, making it difficult to determine the relative degree to which familial resemblance reflects contributions from genes and environment. The basic twin study method treats twinning as a natural experiment that makes use of monozygotic (MZ) twins, who share 100% of their genetic material, and dizygotic (DZ) twins, who on average share only 50% of their genetic material (like ordinary siblings). The environment is assumed to affect members of both types of twin pairs equally, so observed differences in similarity between MZ and DZ pairs are interpreted as reflecting genetic effects. Genetic influences are inferred by the degree to which MZ twins are more similar than their DZ counterparts. Possible limitations to the twin design include the representativeness of twins to the general population and difficulties recruiting the large-scale samples of twins necessary to estimate adequately genetic effects. Nevertheless, twin studies, when combined with traditional family and adoption designs (where parents and their children are not genetically related) have provided many insights into genetic influences on human behavior.

Three types of influences on behavior can be estimated from the basic twin method: genetic factors, shared environmental factors, and nonshared environmental factors. An estimate of genetic influence gleaned from the twin method is referred to as *heritability* or the proportion of variation in a given behavior that is due to genetic factors. Heritability estimates range from 0.0 to 1.0, with a value of 1.0 indicating that 100% of the variability in the trait can be accounted for by genetic factors. *Shared environmental factors* refer to environmental experiences that members of a twin pair share in common, and act to make individuals similar to each other. Examples of shared environment include growing up in the same neighborhood and being reared by the same parents. Shared environmental effects are inferred when the similarity of DZ twins approaches that of MZ twins. *Nonshared environmental factors* refer to those unique factors that members of a twin pair do not share, and thus act to make individuals different from each other. An example of nonshared environmental influence is distinct peer group influence for each member of the pair. Such nonshared environmental effects are inferred from the degree to which MZ twins are dissimilar for a trait of interest. At this most basic level, behavioral geneticists estimate degree of genetic, shared and nonshared environmental influences,

but such an analysis cannot identify specific environments or genes influencing behavior.

A variation of the basic twin design is the *twins reared-apart method*. This method identifies rare sets of MZ twins separated early in development and reared in different families. Any similarity in behavioral traits observed in such twins can be attributed to genetic effects because they did not share common rearing environments. Thomas Bouchard, a leading scientist in the twins reared-apart method, collected extensive behavioral data on a relatively large sample of such twins. His data showed striking behavioral similarities between reared-apart identical twins, many of whom met for the first time in his laboratory. Similarities were found for diverse attributes, including personality, vocational choices, attitudes, and religious beliefs, providing compelling evidence for the influence of genes on the development of numerous facets of behavior and psychological functioning.

The twin design can also be used to evaluate the effects of specific environments on a behavior. In the *discordant twin method*, researchers focus on MZ twins who are discordant (or lack similarity) on a given behavior or trait. Sets of twins who are discordant for the behavior are then examined on the basis of measured environmental variables. For example, studies of twins discordant for schizophrenia have shown that the structure of the affected twin's brain differs from that of the healthy co-twin, indicating that some environmental factor has led to the development of anomalous brain anatomy in the MZ twin with schizophrenia.

Key environmental variables have also been integrated into the basic twin method to elucidate the effects of particular environments on behavior. For example, a researcher seeking to test whether the environmental effects on the initiation of substance use are attributable to peer influence may examine the association between these two factors within MZ and DZ twin pairs to determine if peer influence accounts for a substantial proportion of the individual differences in substance use initiation attributable to environmental influence. In this type of twin investigation, specific environmental effects are evaluated in the presence of genetic influences.

Longitudinal Twin Studies

Twin studies using a *longitudinal design,* or repeated measurements on individuals at several intervals over time, provide a unique opportunity to examine the complex nature of genes and environments over the life span. Wattington put forth the concept of *canalization,* or the idea that as individuals mature, their range of possible developmental outcomes narrows. Similarly, evidence from longitudinal twin studies have generally suggested that genetic influence on behavior increases as individuals grow older. Large-scale twin studies spanning infancy, adolescence, adulthood, and late adulthood have been undertaken in several countries. Results of these studies have offered insights into the nature of environmental influence on alcohol and drug use behaviors ranging from initiation of alcohol use to severe forms of alcoholism. Studies of Danish twins during the course of very late adulthood have offered insights into the effects of genes on normal aging.

Gene-Environment Correlation and Interaction

Sandra Scarr, a developmental behavior geneticist, has emphasized how heredity and environment work synergistically rather than independently. Genes and environments are *correlated* when individuals with certain inherited propensities develop associations with environments partial to their genetic inclinations. For example, a child with genes favoring the development of musical talent may seek out friends who enjoy music and join a band. Rather than environmental exposure simply encouraging the development of musical talent, genetic proclivities encourage the selection of musically relevant environments. A *gene-environment interaction* results when an inherited tendency is more likely to be expressed in one environment than another. For instance, heritability estimates of alcohol use may differ in urban and rural environments. In urban settings, where there is less community monitoring and accountability and more avenues to access alcohol, more opportunities exist for increased expression of genetic dispositions to drink alcohol.

THE APPLICATION OF TWIN STUDIES TO UNDERSTAND DEVELOPMENTAL PHENOMENA

The study of human development has benefited from the use of twin studies, and psychologists have used the method to evaluate several psychological domains. In his 1929 pioneering study, Gesell used twins to demonstrate the influence of genes on learning. A pair of infant twins was compared on

stair-climbing behavior. One twin was trained in the behavior and one twin was not. The untrained twin soon independently learned the behavior, thus demonstrating that without explicit training (or environmental intervention), a natural developmental phenomena can take place.

Twin studies have also offered insights into the development of temperament and emotion regulation. Goldsmith and colleagues examined infant twins on measures of temperament, behavioral inhibition, and responses to strangers. His studies demonstrated that a significant proportion of variation in early temperament can be attributed to genetic factors. Thus, genes may influence an infant's shyness or soothability. These scientific developments provided convincing evidence that infants were not born *tabula rasa* (or "blank slates"); rather, some significant amount of emotion and behavior can be accounted for by genes.

One of the most significant advances in understanding the causes of schizophrenia originated from the findings of twin studies. In the early 20th century, a predominant etiological theory of schizophrenia placed the blame for the development of this psychosis on poor parenting. Twin studies by Irving Gottesman demonstrated that, contrary to the importance assigned to family environment, schizophrenia is strongly influenced by heredity. The information gleaned from such twin research has led to shifts in how schizophrenia is treated and studied, including providing the rationale behind the push to identify candidate genes influencing schizophrenia's development.

The Future of Twin Studies

Twin research remains a viable natural experiment that helps to elucidate the effects of genes and environments. The application of state-of-the art scientific methods to the area of twin studies (including brain neuroimaging techniques and molecular genetics) will offer exciting new opportunities to understand how genes and environments combine to influence behavioral attributes.

SUMMARY

Twin studies provide a useful natural experiment to evaluate the degree to which genetic and environmental influences determine variability in a given trait. Life-span studies of twins have offered specific insights into normal and abnormal developmental processes, ranging from the development of stair-climbing to the emergence of alcohol misuse and schizophrenia. Results of twin studies are used to guide research into the development of a broad array of psychological attributes.

—Serena King and William G. Iacono

See also Multiple Births, Twins

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TWINS

Twins are a biological fact. As such, they occur in at least two different ways. One pattern involves one egg, fertilized by one sperm, which splits sometime during the first fourteen days after fertilization, thus producing *monozygotic* (uniovular) or "identical" twins. These twins have the same genetic make-up as each other and are always the same sex, being both boys or both girls.

The other twin pattern involves two eggs, each egg fertilized by a separate sperm. Eventually they produce *dizygotic* (binovular) or "fraternal" or "nonidentical" twins. Nonidentical twins may either be of the same sex, that is, two boys or two girls, or unlike sex pairs, that is, a boy and a girl. Genetically, either type of nonidentical twin, same sex or unlike sex pairs, are genetically as similar as any other two siblings. This genetic relationship can range from 25% to 75% of genetic similarity.

There are also some rarer types of twins. These categories include: mirror-image twins, who are identical twins; polar body twins, called half-identical twins; or conjoined (Siamese) twins, who are identical twins.

With the increasing use of ultrasound scans, twins have been detected early in a pregnancy but have

"vanished" according to subsequent ultrasounds. This phenomenon has been termed the vanishing twin syndrome.

The incidence of identical twins has remained more or less constant; this constancy applies to most cultures over any given time period. Roughly about one third of all twins are identical and two thirds of all twins are fraternal.

In both the United States and the United Kingdom, the probability of having twins as of 1999/2000 is roughly 1 in 35 pregnancies. The chances of having twins in these two countries has risen recently mainly due to older mothers having babies and the increasing use of fertility treatments.

Rates of fraternal twins vary in different countries, with African countries producing the highest rates and Asian countries the lowest rates of twinning.

MYTHS ABOUT TWINS

Myths about twins picture twins as being both positive and negative, harmonious and rivalrous, happy and unhappy, divine and human. Throughout the world's cultures, myths identify twins as gods who are deified men or women (such as in North and South American cultures). Other twin myths are foundation myths such as in the Biblical story of Jacob and Esau, indicating that two nations are to be born, or the most famous myth about the founding of Rome by twins Romulus and Remus.

Still other myths treat the issue of double paternity; that is, one twin is depicted as the child of a human father while the other twin has a different and divine father. One version of the *Dioscuri*, Castor and Pollux, otherwise known to us as the Heavenly Twins constellation, Gemini, falls into this group. Some myths attempt to provide answers to the culturally unanswerable. Some North American indigenous peoples, such as the Mohave, believe twins function as rainmakers; others believe that human twins are sent from heaven to bring both rain and fertility.

Thus the very many mythologies and cultures of the world contain quite a considerable number and diversity of myths about twins.

EXPLAINING TWIN BIRTH

The birth of twins occurs in all cultures of the world. In most, the appearance of twins itself is a matter of surprise, even shock, both for the parents and the community at large.

In more traditional, nonindustrial societies, the birth of twins often disrupted the structure of the family and the position of individuals within the family. Twins caused a disturbance to the normal order of things. Sometimes this even involved a potential threat to the social order, so that in some extreme cases one or both twins were faced with infanticide; occasionally, the mother also faced death or, at the very least, ostracism. In these societies, concern about the question of who actually fathered the twins and the ensuing anxiety about the real (or even the imagined) disruptions to the established social system were expressed.

In more industrialized societies, due to the intervention of hospital equipment such as scanners and the increasing use of fertility drugs, which are one of the main reasons for the recent increase in twins and higher multiples, dealing with twinship begins at a much earlier stage, although some parallels with nonindustrial societies can be made.

Attitudes toward twins in different societies are mixed: Whether positive, negative or even ambivalent, these attitudes have been and are currently complex and intense. These qualities of complexity and intensity may include feelings of disturbance, anxiety, and unease about identity, especially individual identity.

TWINS IN THE MEDIA

Twins have provided an endless source of fascination for writers over the centuries. Initially, the overwhelming focus of attention was on the comic potential of mistaken identity, especially for monozygotic or "identical" twins. Subsequently, however, writers began to explore stereotypical—opposite—characteristics of twins, such as moral opposites of good versus evil, or opposites of identity, like versus unlike, twins as same versus twins as fundamentally different. Fiction writers also used the double (or the *doppelganger*) in their writing.

Alongside questions of identity, twins have been used by writers to illustrate a range of human behavior associated with twinship. One ever-present theme of this type would be the closeness of twins, such as is found in Bruce Chatwin's famous novel *On the Black Hill*. Another example of the very strong bond thought to exist between twins is found in Thornton Wilder's *The Bridge of San Luis Rey*. In children's literature, we find *Sweet Valley Twins*, where identical twin girls look so much alike it is virtually impossible to tell

them apart, but yet they are described as having very different personalities.

In films, twins have been used in general to illustrate and explore themes of personal, psychological, and social identity. Several look at mistaken identity and its consequences, such as in *The Parent Trap*; others explore the indelible effects of twinship, such as Jodie Foster's twin portrayal in *Nell*. But the very refreshing and recent expression of the dichotomy of twins is Ivan Reitman's *Twins* where Danny DeVito and Arnold Schwarznegger play twin brothers, causing the audience to think that they can't be twins because they do not look anything alike, let alone look identical!

Twins in the press fare somewhat differently. Articles often appear about famous twins and famous parents of twins, such as agony aunts Ann Landers and Abigail van Buren or parents of twins Mia Farrow or James Stewart. Other articles focus on the unusual nature of being a twin, exploring the possible psychic affinity between twins, especially looking at those twins who were separated for one reason or another early in their lives. The actual birth of twins and the subsequent parenting of twins forms another category, followed by articles explaining or exploring what it is actually like to be a twin. Finally there are articles revolving around science and nature, often using twins to measure intelligence.

UNIQUE RELATIONSHIPS AND CHARACTERISTICS

The bottom line for analyzing the unique relationship between twins must be the fact that unlike singletons, twins are two babies who are born more or less at the same time. This biological fact has consequences for the twins from the first prenatal stages of their lives, through the birth itself, and quite obviously for their subsequent development as children, as young people, and eventually as adults.

Scientists studying twins are currently debating about the role that genetics plays in relation to environment, also known as the nature versus nurture debate. Twins have been used to prove the greater influence of either nature or nurture on behavior, although more and more studies accept the interplay between the two (influences). This is vital for actually understanding the determinants of behavior of different sets of twins.

Knowing whether a twin is identical or fraternal is also vitally important for those scientists hoping to explain behavior and development by twin type. The most popular current method of *zygosity* determination (determining whether twins are fraternal or identical) is by DNA testing; a swab of cheek cells from each twin will determine whether they are identical or not.

Much twin research has focused on the different types of twins, hoping to establish relationships concerning the role that genetics plays. Other social scientists are concentrating on the role that environment plays, but they are now not assuming that twins necessarily share the same environment, any more that any other sibling in a family shares the same environment. In other words, each twin has another person (his or her twin) directly or immediately in their environment, virtually from the moment of conception. And this other person, the twin, modifies and determines the environment in which they both live. They are defined and often treated as twins, although like other siblings they also face varying environments due to gender differences, positions in the family, relation to parents, and so on. Nonetheless, they share the "twin factor."

SUMMARY

Twins are different, distinct, special, and fascinating. They have been studied, analyzed, and written about for a long time in all cultures, yet there is still a great deal to learn both about twins and from twins.

—Elizabeth A. Stewart

See also Fraternal Twins, Identical Twins

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U

Utopianism

Without the Utopias of other times, men would still live in caves, miserable and naked. It was Utopians who traced the lines of the first city. . . . Out of generous dreams come beneficial realities. Utopia is the principle of all progress, and the essay into a better future.

—Anatole France

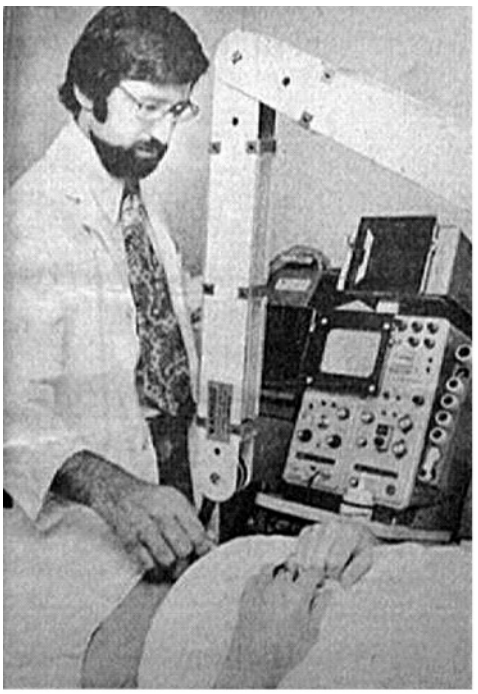
ULTRASOUND

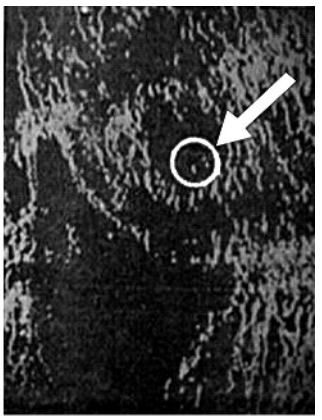
The use of ultrasound in medical diagnosis had its beginnings as *sonar* (sound and navigation ranging) used in the First World War by submarines for underwater navigation. Ultrasound generation and detection was based on the use of a piezoelectric crystal such as quartz or PZT (lead zirconate titanate) whose inherent composition allowed it to convert electric to mechanical energy, as well as the reverse. An electrical impulse was used to excite the crystal, which generated a wave of high-frequency sound (above 1 million cycles per second, or 1 megahertz) that traveled through any solid or fluid medium but not through air. When this pulse wave encountered a material of differing density, some of the energy would pass into it and some would be reflected back to the emitting crystal. If the crystal was kept inactive, it would detect the returning pulse wave and would convert this mechanical vibration into an electrical impulse that would be displayed on a monitor or oscilloscope.

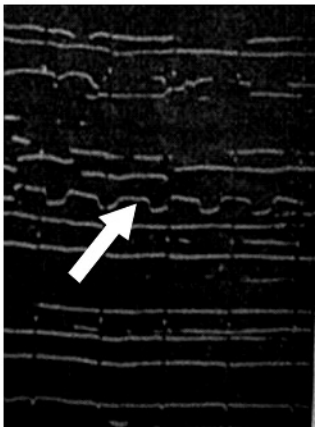
In the early 1940s, the piezoelectric effect was used to detect flaws in metal. Using one of these early systems, Karl Theodore Dussik, a neurologist at the University of Vienna, detected some brain tumors. In Denver, Joseph Holmes, a kidney specialist and acting director of Medical Research, had his engineers build the first two-dimensional ultrasound scanner in 1951. The patient was placed in a water bath while the ultrasound probe moved around the abdomen. This unit was called the Somascope and was featured in the Medicine section of *Life* magazine in 1954.

Ian Donald, a professor of Obstetrics and Gynecology in Glasgow, saw the potential of this technique and first reported on its use in women to detect masses and to differentiate solid from fluid-filled or cystic masses. With the help of some engineers, he built an ultrasound scanner that did not require placing the patient in a water bath, thereby making the technique much more accessible. The case that changed his life was that of a woman who had been diagnosed with a large abdominal mass thought to be an inoperable tumor. Using ultrasound, he saw that the mass was a simple fluid-filled ovarian cyst, promptly removed it, and "saved" her life. Ian Donald was a remarkable individual with whom I had the privilege of studying in the early 1970s. He was not only a leading obstetrician and researcher but also an accomplished painter, pianist, scientific writer, and sailor, all the while suffering heart failure from a leaking mitral valve.

Ultrasound has been used during pregnancy routinely since the late 1970s. It can visualize the pregnancy







Completing a sonogram

from 5 to 40 weeks of gestation; determine the correct fetal age by measuring the fetus' length, head, abdomen, and legs; and monitor fetal growth. The fetus can be examined using ultrasound, and most abnormalities in all of its vital organs can be detected. It can detect multiple pregnancies and ectopic pregnancies. The position of the placenta is also routinely examined by ultrasound during pregnancy.

Ultrasound is used in more than 75% of pregnant women to accurately establish the age of the fetus and to detect abnormalities in the fetus, amniotic fluid, and placenta. Ultrasound scanners are found in most hospitals around the world and in many obstetricians' offices.

An ultrasound scanner today is basically a computer, and as computers get smaller and faster, so too does the scanner. It is now capable of producing stunning three-dimensional images. Finally, even though the technology is sophisticated, it requires a trained operator, technologist, and physician to accurately interpret the information collected.

—Edward A. Lyons

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UNIVERSAL GRAMMAR

The definition of universal grammar has evolved considerably since first it was postulated and, moreover, since the 1940s, when it became a specific object of modern linguistic research. It is associated with work in generative grammar and it is based on the idea that certain aspects of syntactic structure are universal. Universal grammar consists of a set of atomic grammatical categories and relations that are the building blocks of the particular grammars of all human languages, over which syntactic structures and constraints on those structures are defined. A universal

grammar would suggest that all languages possess the same set of categories and relations and that in order to communicate through language, speakers make infinite use of finite means, an idea that Wilhelm von Humboldt suggested in the 1830s. From this perspective, a grammar must contain a finite system of rules that generates infinitely many deep and surface structures, appropriately related. It must also contain rules that relate these abstract structures to certain representations of sound and meaning—representations that, presumably, are constituted of elements that belong to universal phonetics and universal semantics, respectively.

This concept of grammatical structure is an elaboration of Humboldt's ideas but harkens back to earlier efforts. In *Cartesian Linguistics*, Noam Chomsky traces precursory work related to UG in the writings of Panini, Plato, and both rationalist and romantic philosophers, such as René Descartes (1647), Claude Faure Vaugelas (1647), Cesar Chesneau DuMarsais (1729), Denis Diderot (1751), James Beattie (1788), and Wilhelm von Humboldt (1836). Chomsky focuses in particular on early efforts by the 17th-century Port Royal grammarians, whose rationalist approach to language and language universals was based on the idea that humans in the "civilized world" share a common thought structure. Moreover, he traces the conception of linguistic structure that marked the origins of modern syntactic theory to Lancelot and Arnaud's 1660 Port Royal work, *Grammaire generale et raisonnee*, which postulated a link between the natural order of thought and the ordering of words. Much of what came to be known as modern linguistics in the 20th century belied philosophy in favor of behaviorist currents and various structuralist approaches that on the one hand narrowed this domain of inquiry, while on the other hand providing an expanded database that came to be critical for those willing to use it in a return to traditional concerns. The rejection of historical approaches occurred in part because of the newfound optimism, inspired by contemporary scientific methods and by the "new methods" in linguistics, about the possibilities for making real advances in our understanding of how language functions. In the background of this optimism lie the great discoveries in mathematics and physics, the promise of a new computer and telecommunications industry, the political requirements for enhanced language research, and the concomitant funding offered for such endeavors by the American government, particularly after 1939.

Consistent with earlier work on universals, Universal Grammar came to refer to aspects of the grammatical structure that form the makeup of grammars of all "natural languages." According to Chomsky's early work, there are two keys to the understanding of human language, universal grammar and deep structure, the former described as a sort of metatheory, the latter a technical term pertaining to the particular grammar and designating a precise stage in the derivation of a sentence. To advance our understanding of both, his early goals were threefold: first, to determine what is the nature of the intuitive, unconscious knowledge that permits the speaker to use his or her language; second, to construct an explanatory theory; and third, to consider the general principles of language as the properties of a biologically given system that underlies the acquisition of language.

Chomsky enters the scene in the 1940s, at the height of the optimism, and in a project that both furthered and challenged this work, he wrote an undergraduate thesis called "Morphophonomenics of Modern Hebrew," later expanded to a master's thesis with the same title in 1951. That work was a "generative grammar" in the contemporary sense because it contained a rudimentary generative syntax. Chomsky claims it as the first example thereof, but also recalls classical precedents, including Panini's grammar of Sanskrit and, at the level of morphology and phonology, Leonard Bloomfield's *Menomini Morphophonemics*, published only a few years earlier. The goal of this work was an attempt to demonstrate that the generative grammar presented was the simplest possible grammar in a well-defined technical sense: namely, given a certain framework for the formulation of rules and a precise definition of "simplicity," the grammar was "locally optimal" in the sense that any interchange of order of rules would lead to a less simple grammar. This work was undertaken for Zellig Harris, who at that time was involved in a related, but differently focused, problem of transformations in a structuralist paradigm. Chomsky's early sense was that the discovery procedures and the methods employed by structural linguists such as Zellig Harris were in principle correct, and that only some refinements were necessary to make them work, in the sense of being able to produce a correct grammar with infinite descriptive scope from a finite corpus of the language.

What irked Chomsky early on, however, was Harris's deferring to behaviorist and empiricist models, which he resisted, on the basis of his "Cartesian" belief that one should assume that the general form of the

resulting system of knowledge should be given in advance. For Chomsky, the system required to produce human language could not be constructed gradually, step by step, by induction, segmentation and classification, generalization and abstraction, and so on. This was different for Zellig Harris, for whom the goal was to use certain "transformations" to "normalize" the discourse, to transform complex sentences into uniform simple structures to which the methods of structural linguistics might apply: segmentation of sequences, substitution of elements, classification, and so on, all of which suggested that transformations were simply systematic relations between sentences and surface structures. If Harris's assumptions were right, then obviously machines could play a role in such a project, and indeed he believed, along with many others, that computers were going to permit the automation of discovery procedures in linguistics. The idea would be to present a corpus of material to the computer so that it would work out the grammar of the text, on the assumption that the taxonomic procedures of analysis that had been developed were in essence sufficient and adequate to determine grammatical structure. It was quite generally supposed within such circles that B. F. Skinner's theory of behavior approached adequacy, and that the notions developed within the theory of communication furnished a general framework for the study of language within this structuralist paradigm. Chomsky rejected the empiricism of this model, so that even in his earliest work, a transformation is not a relation between two sets of sentences, or between two surface structures; it is a rule within a system of rules that assigns structural descriptions to an infinite class of sentences. In the derivation of a particular sentence, a transformational rule applies to an abstract representation of this sentence and transforms it into another abstract representation. The initial representation is the so-called *deep structure*, which is transformed step by step into terminal (or surface) structure through transformational rules. These surface structures take on a particular phonological form and emerge as the sentences one actually hears.

With Chomsky, therefore, a shift in scientific paradigms in the work of linguistics occurs that works on universal grammar away from the ambitions of mathematics, structuralism, empiricism, and behaviorism and toward biology and a branch of cognitive psychology wherein the basic problem is posed by the human capacity to acquire a natural language, something that he insisted we should see as remarkable, with regard both to what the child experiences and to what he or she acquires. What the child acquires is an indefinitely extensive creative capacity to produce and to understand an open-ended set of sentences that he or she has never heard before. To explain the gross disproportion between what is acquired (in the form of competence) and what is experienced (in the form of speech), Chomsky posited a strongly constrained, internal, innate mechanism that, when triggered by the experience of speech, builds a cognitive structure, a grammar of the language, within limits set by very specialized schemas. Because any child can learn naturally any human language, these schemas had to be universal; thus, when Chomsky referred to the properties of the innate mechanism, he indicated that each of us possesses, indeed knows, the principles of a universal grammar. What exactly is involved in the innate component, what principles the language-acquisition device is armed with, are the technical matters that make reading Chomsky's work so complex; however, in terms of overall objectives, the more general question is to describe their presence, which he did through the terminology of unconscious, innate *knowledge* that, once again, is his way of connecting his theories with those rationalist thinkers of the 17th century.

Therefore, from the early 1960s, the universal grammar objective was to abstract general principles from the complex rule systems devised for particular languages, leaving rules that are simple, constrained in their operations by underlying principles. By the mid-1970s, many particular aspects of the theory had changed, notably on the matter of the relations between syntax and semantics, leading Chomsky to abandon the "standard" theory of *Aspects of the Theory of Syntax* (1965), by which semantic interpretation was applied to deep structure, and instead to apply semantic interpretation to surface structure. He also abandoned his use of the term *deep structure* for those initial abstract base sentences to which the transformations are applied because not only these base sentences, but also processes applied at the level of surface structure, were deemed "deep" in the sense that they express important and hidden human powers. This is the shift that is familiar to those who have read more recent work by Chomsky because it insists on the power of linguistic theory to reveal the depth of the human mind. It implies an uncovering of lower, but continuously related, levels of human thought, further questioning the shallower and more mechanical view of the empiricist outlook, which incidentally can

be easily associated with a denial that there is a human nature, an idea that perhaps had currency for its ability to be employed for manipulative and authoritarian conceptions of purposes, one of the few links between language and politics in Chomsky's work.

As far as methodology was concerned, in Chomsky's early universal grammar work, much effort was exerted to extract and describe a great number of rules, and no distinction between rules and conditions of rules was made at this stage; by the 1970s, Chomsky was trying to do the opposite, to limit the expressive power of the rules. Thus, there is considerable evolution in the theory of universal grammar, even while there is consistency, as he himself notes in the Minimalist Program. Chomsky maintains some underlying factual assumptions that date back to his work in the 1950s, notably that there is a component of the human mind or brain dedicated to language and the language faculty, which interacts with other systems. He also maintains that performance systems are in part language specific (and hence are components of the language faculty) and that the cognitive system interacts with the performance systems by means of levels of linguistics representation. Thus, for the model, the cognitive system is deemed to interact with the articulatory-perceptual system and with the conceptual-intentional system through two interface levels—phonetic form at the articulatory-perceptual interface and logical form at the conceptual-intentional system—which links his work to earlier ideas about the relation of sound to meaning. What is new, and what has led to recent works such as Baker's *The Atoms of Language,* is the emphasis on principles and parameters, which holds that languages have no rules in anything like the familiar sense and no theoretically significant grammatical constructions except as taxonomic artifacts. There are universal principles and a finite array of options for how they apply (parameters), but no language-particular rules and no grammatical constructions of the traditional sort within or across languages. The resulting project aims to show that the apparent richness and diversity of linguistic phenomena is illusory and epiphenomenal, the result of interaction of fixed principles under slightly varying conditions. As Chomsky put it, these are the "new horizons in the study of languages and the mind"—new in emphasis, ancient in ambition.

—Robert F. Barsky

See also Chomsky, Noam; Language Development

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U.S. BUREAU OF THE CENSUS

The U.S. Census Bureau, also known as the U.S. Bureau of the Census, has existed as a separate agency

since 1903. The primary task emanates from the constitutional mandate for the taking of a census every 10 years for purposes of apportioning political representation among the states according to the distribution of the population. Just as dramatic changes occurred over time in implementing this count, as technologies evolved from hand calculations and early tabulating machines to efficient, high-capacity computers and the population grew and diversified, according to the Census Bureau, the mission has become "to be the preeminent collector and provider of timely, relevant and quality data about the people and economy of the United States. We will succeed by valuing our employees, innovating in our work, and responding to our customers." The crucial topics are people, housing, business, and governments, and the major resource is the decennial census of population and housing, although this leading statistical agency is increasingly central for other sources (surveys, administrative statistics, and other information).

The U.S. Census has been taken 22 times. Early census information appears not only in yellowed volumes but also online for 1790 to 1870, as does 1990 and 2000 census information. These statistics are the population's historical record and appear in compilations (e.g., Statistical Abstracts) and comprehensive reviews, other publications, and the integrated public-use microdata sets from the University of Minnesota. As a federal agency pioneering electronic dissemination of reports in the past decade, the Census Bureau releases data promptly, and this empowers data users with easy access and capabilities. The decennial censuses account for core activities to gather data on the demographic, social, and economic characteristics of the U.S. population that are reported in government publications, scholarly articles, and census monographs supported by the Russell Sage Foundation, which help explain changes during the decade. The Census Bureau staff implements other federal surveys that examine labor force trends, health status, and program participation, and one of these, the Current Population Survey, provides the basis for annual poverty and income measures.

The first census in the new millennium has been noted as the best census ever, and the 2000 census may also have been the last census that involved collection of detailed characteristics. The usual positive correlation of economic development with statistical infrastructure simply may not be applicable for the United States confronted with considerable capabilities for gathering statistics on a complex population given the escalating costs of that effort. The 2010 census is to be the reengineered census, with the American Community Survey regarded as the way to collect detailed characteristics nationally on a continuous basis.

Censuses have historically compensated for serious gaps in statistical systems, and regular counts are especially valuable, with 10s of millions of migrants in a world on the move. From about 2 million in 1950, the U.S. Hispanic population has grown quickly to 35 million in 2000, particularly affecting states and metropolitan areas of high immigration of the West and South. Demographers are intrigued not only by the classical questions of changing composition and changing propensity but also by quantifying population change. After the 2000 U.S. Census count of 281.4 million was higher than expected, several studies concluded recent unauthorized immigration in the 1990s was higher than officially allowed. Thus, census demographers have been able to benchmark the population estimates with more "correct" components of population change.

The overall population growth as a consequence of fertility and immigration of Asians, Latinos, and others means the United States is the only developed nation projected in the top 20 countries by 2050. Amnesty programs for unauthorized residents and agricultural workers in the late 1990s transformed the U.S. Mexican population as to lawful presence, unauthorized migration continued despite intensified enforcement at the southern border, and authorized immigration continued, especially of family members, enhancing integration within American places and institutions. Scholars are building a collection of new immigrant and new ethnicity studies on the basis of statistical portraits from census and surveys in conjunction with rich, qualitative studies.

—Karen A. Woodrow-Lafield

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UTOPIANISM

Utopian dreaming is not unique to one historical period but represents a theme that runs throughout human history. Although Thomas More coined the term *utopia* in 1516, utopian thought is evident in ancient texts and stories, including Greek and Roman mythology, Plato's *Republic*, the Hebrew account of the Garden of Eden, and Christian conceptions of "a transcendent heaven of splendor" (Pitzer, 1997, p. 4). Utopian scholars are loath to say that utopianism is part of "human nature," but it is probably accurate to say that all people dream of a better life, if not for themselves, at least for those who are wanting. As Sargent (1994) puts it, "At its root, then, utopianism is the result of the human propensity to dream while both asleep and awake" (p. 4).

Utopianism is evident not simply in literature but also in experimentation. Today, numerous utopian communities can be found around the world, some of them relatively well known and established. Although these communities share the goal of working toward a better world, their differences in religion, politics, economics, governmental structure, and lifestyle often outweigh their similarities. Examples of contemporary utopian communities, as described in 2000 in the Fellowship for Intentional Community's *Communities Directory*, include the following:

- Auroville, a community of more than 1,000 people in India, whose purpose is "to realize human unity"
- The Federation of Damanhur, founded in 1977 in Italy, with a current population of more than 400 people. "Since the very first day of its foundation, Damanhur has been engaged in creating a sustainable way of life."
- Findhorn Community, founded in 1962 in Scotland, which works toward "a joyful, loving and sustainable future on Earth"
- The Kibbutz movement in Israel, which traces its beginnings to 1910 and currently includes about 123,000 people in more than 250 kibbutzim. One group, Kibbutz Lotan, works to create a community based on Reform Zionist Jewish values "including equality, economic cooperation, living in harmony with the environment, mutual respect and the betterment of ourselves, our people and the world."
- The Farm community in the United States, formed in 1971, which is "a place where we can relate to each other and the natural environment in a sustainable way, draw upon the collective strength of the community, and contribute to the positive transformation of the world."
- The Twelve Tribes Network, founded in 1972, which is an international network of communities with a focus to serve God and "to love each other as our Master Yashua loved us, to love our Creator with all our heart, soul, mind and strength and to love our neighbors who live around us as we love ourselves."
- The Emissaries of Divine Light, founded in the 1940s, which is "a worldwide spiritual organization dedicated to the spiritual regeneration of humankind."
- Comunidad Los Horcones, in Mexico, which is a community inspired by B. F. Skinner's novel, *Walden Two*, and whose "basic objectives are to design a society where people cooperate for a common good, share property and reinforce egalitarian, pro-ecological and pacifist behaviors."

As Levitas wrote in 1990, "utopia expresses and explores what is desired; under certain conditions it also contains the hope that these desires may be met in reality, rather than merely in fantasy. The essential element in utopia is not hope but desire—the desire for a better way of being."

—Deborah E. Altus

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V

Volunteering

Be of service. Whether you make yourself available to a friend or co-worker, or you make time every month to do volunteer work, there is nothing that harvests more of a feeling of empowerment than being of service to someone in need.

—Gillian Anderson

VACCINATION

Vaccination is a process that artificially confers immunity to an individual against a specific type of disease caused by infectious microorganisms (viruses, bacteria, fungi, or parasites). Vaccines work by using the body's ability to remember previous infections. When an individual becomes infected by an infectious organism for the first time, the immune system recognizes and then destroys it by mounting an immune response specific for that organism. Upon an individual's second exposure to the same microorganism, the immune system recognizes and eliminates it by mounting immune responses that occur more rapidly and are greater in magnitude than those induced on the first encounter. Thus, the infection will not develop to a severe level or to the disease stage. This ability to remember infections, called *immune memory*, allows people to become immune to a disease after they have caught it once. A vaccine simulates that first infection by exposing an individual to a particular microorganism or portions of that microorganism without causing infection and illness. There are several disease-causing microbes for which vaccines exist. Thus, these diseases can be prevented. Some of the most common vaccine-preventable diseases are diphtheria, tetanus, pertussis, some forms of bacterial meningitis, pneumococcal pneumonia, measles, mumps, rubella, chickenpox, influenza, hepatitis A, hepatitis B, poliomyelitis, and rabies. However, there are still many diseases for which effective vaccines are not available. Some of these diseases are the acquired immunodeficiency syndrome (AIDS), malaria, and schistosomiasis.

Vaccines are made from either all or portions of the microorganism against which the vaccine protects. These portions of the microorganisms are called *antigens* and, in most cases, are proteins, glycoproteins, or polysaccharides. There are three traditional types of vaccines. *Inactivated vaccines* are made from organisms that have been killed in such a way that they still retain most of their original structure. Examples are the inactivated polio vaccine and the influenza vaccine. *Live-attenuated vaccines* are made of live organisms that have been weakened so that they replicate poorly in the human host and therefore do not cause disease. Examples are measles, rubella, and chickenpox vaccines. *Subunit vaccines* are made from only some portions of the organism. These often

contain toxins that have been altered so that they are no longer dangerous, and are called *toxoids*, as, for example, the tetanus and the diphtheria vaccines. Other subunit vaccines contain recombinant protein antigens, as, for example, the hepatitis B vaccine. A particular class of subunit vaccines is represented by conjugate vaccines, which consist of bacterial polysaccharides linked to protein carriers. An example is the *Haemophilus influenzae* type B vaccine.

Several types of vaccines are still in the experimental stages and will be part of a new generation of vaccines in the future. These include *DNA vaccines*, which use the gene encoding a particular protein from an organism, and *recombinant vector vaccines*, which use an attenuated virus or bacterium to introduce a gene from another microorganism into the host, thus eliciting an immune response against the antigen encoded by that gene. A third type of experimental vaccine is one that does not target microorganisms, but rather is designed to aid in the elimination of cancer cells. This type of vaccine, termed *dendritic cell vaccine*, relies on the host's own dendritic cells, a category of white blood cells responsible for the activation of T lymphocytes, to recognize cancer cells and therefore contribute to the mechanisms necessary for their elimination.

Vaccine efficacy is usually improved through the use of adjuvants. These include natural or synthetic compounds used in vaccine formulations that aid in enhancing the immune response to vaccines. Although there are hundreds of compounds being evaluated as vaccine adjuvants, the alum (aluminum hydroxide) adjuvant, first described in 1926, remains the only one used in human vaccines licensed in the United States. Vaccine efficacy is also improved by giving recurrent doses of a vaccine. This practice, called *boosting*, is done to allow the immune system to remember previous vaccinations by exposing it to the vaccine more than once, and therefore to produce stronger memory immune responses that are effective for an extended period of time.

The U.S. Food and Drug Administration (FDA) requires extensive research and testing to ensure vaccine safety and efficacy. Before a vaccine can be licensed for general use, preclinical studies must take place, usually in the form of laboratory and animal testing. Researchers test candidate vaccines using cell cultures and animals such as mice, rabbits, guinea pigs, or monkeys. If the vaccine is successful in these preclinical studies, it can go on to be tested in humans. Human studies involve a series of clinical trials consisting of four phases. Phase I studies enroll up to 20 people and primarily test for safety. Phase II studies involve 50 to several hundred people. These studies continue to test for safety and try to determine the best dosage and gather preliminary data on a vaccine's effectiveness. Phase III studies involve thousands of people and are designed for thorough testing of vaccine efficacy. Finally, phase IV studies are conducted to test for rare or delayed adverse reactions that might not have been detected in the smaller studies leading to licensure.

An important goal in vaccine efficacy is to protect an entire community against disease. Individuals who are vaccinated have antibodies and immune cells against a disease-causing organism, so they are much less likely to become infected and transmit that organism to others. This allows individuals who have not been vaccinated or whose vaccines are not fully effective to be protected. This concept is known as *herd immunity*. As the percentage of vaccinated individuals increases, the rate of herd immunity increases.

Since the conception of vaccines, their use has been strongly debated. Several literature reports claim that vaccines have failed and have sometimes caused adverse reactions. In 1998, the American Medical Association reported that measles, a typical childhood disease, is becoming more prevalent among adults as the immune response to the vaccine eventually wears off. The inefficacy of the whole-cell pertussis vaccine was demonstrated when the Centers for Disease Control and Prevention (CDC) released reports that, in 1993, pertussis was at the highest levels since 1976. The failure of manufacturers to sometimes do sufficient research before releasing a product became evident when in 1999 the FDA cancelled use of the rotavirus vaccine almost 1 year from the day it was released. This vaccine protected children against the leading cause of childhood diarrhea but resulted in a dangerous bowel obstruction in infants. Incidents such as seizures, brain damage, ataxia, aseptic meningitis, paralysis, learning difficulties, and deaths have been documented within days or weeks following certain vaccinations. In 1986, the federal government established the National Vaccine Injury Compensation Program (NVICP) to compensate those who suffer from adverse effects of vaccines. Since that time, more than $1 billion has been paid in injury awards to these individuals.

Another concern regarding vaccines relates to the chemicals that are used in the manufacturing process. Chemicals such as formalin and thimerosal are often used as preservatives and bactericidals in vaccines, whereas aluminum salts are commonly used as adjuvants. There is concern about the exposure to these chemicals, which may be toxic. Although studies indicate that the levels of chemicals used as preservatives in manufacturing vaccines are within a safe range, the CDC, FDA, Academy of Pediatrics, and Public Health Service have recognized this as a legitimate concern. As a result, the FDA has encouraged pharmaceutical companies to manufacture single-dose vials of the vaccines without thimerosal, formalin, or other chemicals.

Despite reports of adverse reactions linked to vaccines and the chemicals used in the manufacturing process, statistics show that the numbers of such reports are extremely low compared to the number of children vaccinated each year. Very few reports have shown definitive evidence linking vaccines to all adverse effects. Illness occurring after a vaccination is regarded as an adverse effect of that vaccine, although the exact cause may be unknown. Further studies are needed to document evidence of vaccines causing adverse reactions.

In the early 20th century, infectious diseases were widely prevalent and had an enormous toll on the population because few effective treatment and preventive measures existed. Since then, substantial achievements have been made in the control of many vaccine-preventable diseases in many countries. Smallpox, which once caused rampant epidemics, was officially eradicated in 1980 as a result of the World Health Organization (WHO) mass vaccination campaign. Poliomyelitis and measles are other infectious diseases targeted for eradication. The rate of occurrence of vaccine-preventable diseases has dramatically decreased in the past decades. The use of vaccines is one of the few approaches that can prevent a disease from occurring, rather than attempting to cure it after it has developed. In general, the risks for adverse effects to vaccines are considered insignificant compared with the benefits of vaccination. According to the CDC, vaccination rates are at an all-time high, and occurrences of childhood diseases are at an all-time low. Thus, although few concerns exist, it is clear that vaccine benefits outweigh the risks.

—Roberta Attanasio and Feda Masseoud

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VALIDITY

Validity refers to the extent to which a test measures the construct it purports to measure. Essentially, validity has to do with the meaningfulness and usefulness of the specific inferences made from test scores. For example, regarding a measure of assertiveness, the question of its validity would be whether it actually measures assertive behaviors. A truism is that a test can be reliable (i.e., stable and consistent) but not valid, but a test cannot be valid without first being reliable. The different types of validity include *face, content, criterion*, and *construct validity*.

Face validity is the simplest type of validity and refers to how well items on a test reveal the purpose or meaning of the test. For example, the test item "I feel sad all the time" has obvious face validity as an item measuring depression. The downside of test items with clear face validity is that they may be easily manipulated by respondents, either to minimize or exaggerate problems. Some psychometricians appreciate tests that lack face validity but still possess general validity. Test items that still measure what they purport to measure but lack face validity are harder for respondents to manipulate.

Content validity of a test refers to the adequacy of sampling of content across the construct being

measured. Given the published literature on a particular construct, are all aspects of that concept represented by items on the test? Consider a psychological theory of depression that holds that depression is caused by negative thoughts about oneself, the world, and the future. A test of depression according to this model should include items that measure these three aspects. A strategy testmakers follow to achieve content validity is to summarize what experts claim to be the nature of a particular construct and then create test items to reflect the consensus. Items measuring a construct should appear in equal proportion to what the literature search reveals or what the experts claim about that particular construct.

Criterion validity (also called *predictive* or *concurrent validity*) refers to the comparison of scores on a test with some other external measure of performance that is theoretically related to the first measure. The relationship can be assessed by a simple correlation coefficient. Some psychometricians further divide criterion validity into predictive or concurrent validity. With predictive validity, the new test is given to a group of participants who are followed over time to see how well the original assessment predicts some important variable at a later point in time. In concurrent validity, a new test is given to a group of participants who complete other theoretically related measures concurrently (at the same time). How can a testmaker demonstrate concurrent validity if he or she is the first to create such a test? Unfortunately, this is not easy. The testmaker must use forms of validity other than concurrent validity if there are no other known measures of that construct. This problem is particularly troublesome for diagnostic measures in psychology. Because there are no definitive biological markers used for the diagnosis of any mental disorder, there are no objective gold standards for diagnostic accuracy. This fact makes it difficult to assess the criterion-related validity of any diagnostic test in psychology.

Construct validity refers to the extent to which a test captures a specific theoretical construct or trait. This requires a test to be anchored in a theory that delineates clearly the meaning of the construct, its uniqueness, and its relationship to other variables measuring similar domains. Psychometricians typically assess construct validity by giving other measures of a trait along with the new proposed measure of a trait and then testing prior hypothesized relationships among the measures. Such hypothesized relationships typically include a mixture of meaningful positive relationships and meaningful negative relationships.

—Daniel L. Segal and Frederick L. Coolidge

See also Reliability

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VERY LOW BIRTH WEIGHT (VLBW)

The birth of a newborn infant is a joyous event, but for many families, the reality of an extremely premature baby can be sudden and unexpected. Recent changes in prenatal care practices have enabled the survival of many infants that would have otherwise died after birth. Very low birth weight (VLBW) is part of a larger category of low birth weight. In 1950, the World Health Organization adopted the figure of less than 2,500 grams (5 lb., 8 oz.) as a universal cutoff to determine low-birth-weight status. Within this definition, very-low-birth-weight cutoffs were determined at weights less than 1,500 grams (3 lb., 4 oz.), and extremely low-birth-weight was defined as less than 750 grams (less than 2 lb.). VLBW infants are all born preterm (less than 37 weeks' gestational age) and are likely to experience varying degrees of intrauterine growth failure. Today, VLBW children constitute 1.5% of all births in the United States and less than 15% of low-birth-weight births. Racial differences are apparent within this range: 1.2% of white infants and 3.1% of black infants are born at VLBW.

SURVIVAL AND TREATMENT

VLBW is a natural result of preterm delivery, describing babies born chronologically too soon, and is defined as a live-born infant born before the end of the 37th week of gestation (compared with full-term gestation of 40–42 weeks). Gestational age is a predictor of survival, and even a few days may make the difference between survival and death. For example, very few 22-week-old babies have survived. About 50% of 23-week-old babies and 75% of 24-week-old babies given intensive care survive. At 25 weeks' gestation and beyond, although much risk still remains, the chances that a baby will survive and be healthy in the long run are better.

Table 1 shows outcomes based on information obtained from babies less than 29 weeks' gestation born in 1996 in 50 neonatal intensive care units. This table contains information on the survival rate, short-term complications, and treatments, highlighting the importance of gestational age to health outcomes.

An individual baby's chances of surviving depend on four factors: (1) the time into that week (a baby barely 23 weeks' gestation is less likely to do well than a baby almost 24 weeks); (2) the baby's gender (girls tend to do better than boys); (3) multiple pregnancy (singletons tend to do better than individual babies from multiple pregnancies); and (4) whether there was time before birth to give steroid shots to the mother, which helps the baby's chance of surviving and avoiding severe brain bleeding. Depending on these factors, estimates for an individual baby's chances for survival can be anywhere from 25% to 75%.

For babies as small as 500 and 600 grams born at about 24 weeks' gestation, newborn intensive care can currently improve survival. Typically, intensive care may be reconsidered after the first 3 days, when breathing and blood pressure problems are usually resolving and the first brain ultrasound has been reviewed. Most extremely premature babies who survive have at least some degree of handicap. The problems related to the brain are by far the most important because brain injuries often affect uniquely human traits and characteristics, and because brain injuries cannot heal themselves. There is much medical uncertainty of decisions about instituting intensive care in very preterm infants, thus causing difficult ethical decisions for anxious parents.

COMPLICATIONS AND RISKS

Health outcomes are often more favorable when a baby has minimal difficulty with immature lungs, blood pressure, infections, and other problems that can result from an extremely premature birth. Unfortunately, an additional complication is the problem of severe bleeding into the brain, which happens to some extremely premature babies. Small amounts of bleeding in the brain can have little or no effect on a baby, whereas severe bleeding in the brain often cause significant permanent handicaps. When severe bleeding occurs, it almost always happens in the first 3 days after birth. If no severe bleeding is seen, a major hurdle has been successfully cleared. If severe bleeding is seen, the possibility of surgeries for hydrocephalus (excessive fluid accumulation within the brain) and cerebral palsy increases. There is also a greater likelihood that the child will develop serious disorders, including developmental delays, seizures, and learning disabilities.

Several additional health complications are possible, such as retinopathy of prematurity (ROP), an abnormal growth of blood vessels in the retina. ROP occurs because the vascular system in the baby's eye hasn't fully developed. Many cases of ROP disappear on their own, but sometimes the condition leads to scarring. Some premature infants are also at risk for a potentially severe intestinal problem known as necrotizing enterocolitis (NEC). In the most serious cases, this condition can be life threatening. Premature babies are also at increased risk for sudden infant death syndrome (SIDS), a condition in which babies die in their sleep, which claims the lives of about 2,500 infants each year.

Not all preemies have medical or developmental problems. By 28 to 30 weeks' gestation, the risk for these complications is much lower. For babies born between 32 and 35 weeks, most medical problems are short term. Finally, infections in VLBW infants are also common and can cause a baby to become much sicker or die. Unfortunately, the ventilators that help babies breathe and keep them alive also damage the lungs. This can lead to problems with pneumonia through the early childhood years, requiring more time in the hospital.

DEVELOPMENTAL IMPLICATIONS

Of the possible handicaps, perhaps the most important is cerebral palsy, found to be 25 times more

Table 1 Outcomes From Babies Less Than 29 Weeks' Gestation Born in 1996

	Gestation in Weeks			
Estimates for survivors	23	24	25–26	27–28
Total no. of babies admitted to NICU in 1996 (% of babies who survive)	209 (18)	291 (52)	455 (81)	761 (91)
% with breathing problems needing asst ventilation	100	98	98	90
Average no. of days in hospital before going home	130	97	91	69
Significant abnormal brain scans %	23	20	19	10

common in children who had been VLBW infants. VLBW children experience combinations of various neurosensory, developmental, and health problems, which can worsen clinical and educational outcomes. For example, VLBW infants perform more poorly on extensive batteries of neuropsychological tests than do infants born either at higher weights or at term. As they age, there is an increased risk for behavioral problems, especially among boys, including conduct disorder, hyperactivity, and attentional weaknesses. Patterns of shyness, unassertiveness, and withdrawn behavior have also been documented.

School Age

Generally, predictions of future outcomes for VLBW infants depend on waiting until these children are at least 8 years old. Some cognitive skills may be more compromised than others in low-birth-weight children, and this may eventually be reflected in school performance and academic achievement. Levels of achievement in reading, spelling, and math are lower for VLBW children than for children born at full term. These problems are reflected in much higher proportions of low-birth-weight children than normal-birth-weight children who are enrolled in special education programs or repeat grades. About 50% of all low-birth-weight children are enrolled in special education programs.

Within the VLBW group, different classifications of handicap are evident and show different outcomes for the conditions stated previously. VLBW children who are classified in the *moderate* handicap group have borderline intelligence that falls between low-normal and mildly mentally retarded and also often have mild cerebral palsy. With the cerebral palsy, children have permanent difficulties with muscle control, need physical therapy, and usually begin to walk much later than most children. Vision may be impaired even when using glasses. Most children in this group need special education in school. Many children in this group are not able to live independently as adults.

Children in the *severe* handicap group are mentally retarded or have severe cerebral palsy, usually to a degree that keeps them from ever walking without assistance. Children in this group also tend to have the most serious problems with their vision. Although blindness is quite rare, vision is often impaired enough to be a significant problem, even with the best possible glasses. Virtually all children in this group need special education in school, and most are not able to live independently as adults.

Family Considerations

Family issues can become part of the larger picture from the start, particularly when the birth is well-ahead of expectations. Poor parental understanding in the hospital can result from many interactions: poor communication techniques and lack of time in consultations, contradictory messages, parent denial, inexperience in terminology, unwillingness to ask questions, and the lack of opportunity to review the information given. Family-centered neonatal care has been created to empower parents with support, respect, and encouragement, thus enhancing parental strength and competence.

There is always grief when a baby is born extremely prematurely because, no matter how well things go thereafter, the dream of a full-term pregnancy and a healthy baby has been lost. When children grow up to have serious handicaps, it is hard to predict how the family will be affected. A seriously handicapped child can be a cherished member of one family, whereas another family may be torn apart by the experience. Other children in the family

may feel neglected because of the greater attention a seriously handicapped child requires, but they may also learn important lessons in compassion. Having a child with many medical problems can also be a heavy strain on family finances. Even when the infant eventually develops normally, families can be affected greatly by the experience of having an extremely premature baby. Some marriages fall apart under the stress, and varying degrees of depression may occur. Parenting an extremely premature baby can be a difficult, frustrating experience, but with the proper medical and parental education and social supports in place, parents can help their children to flourish.

–AnnJanette Alejano-Steele

See also High-Risk Infants, Low Birth Weight (LBW)

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VERY OLD AGE

Because of the growing population of older adults in technologically advanced countries, researchers in a number of disciplines are becoming increasingly more interested in examining differences between older adults and *very* old adults as well as the transition to very late adulthood. Very old adults (also referred to as *the oldest old*) are typically defined in the literature as those adults who are 85 years old or older; however, some researchers set the criterion at 75 years old. In general, this population has a higher percentage of women compared with other age groups and is characterized by a high degree of comorbidity (i.e., multiple illnesses or conditions), a lower level of education in relation to other age groups, and high rates of institutionalization. The focus of this entry will be on the physical, psychological, emotional, and social characteristics of this group as well as changes that occur in these domains when older adults transition into being part of the oldest old population. It is important to note that this population is characterized by a high degree of heterogeneity, making generalizations very difficult.

PHYSICAL CHARACTERISTICS

As people age, the functioning of bodily systems tends to decline. In addition, the likelihood of adults older than 65 years having one chronic illness is extremely high (80%), with 50% having two or more conditions. These percentages are even higher in adults older than 85 years. The most prevalent of these diseases are cardiovascular disorders, arthritis, and diabetes, with many attributable to health risk behaviors (e.g., smoking, poor diet). In addition, the percentage of very old adults living with Alzheimer's disease increases from 3% in those who are 65 to 74 years old, to 18.7% of those 75 to 84 years old, to 47% of those living past 85 years old. Alzheimer's disease is also the most common reason for institutionalization. Another factor related to institutionalization is functional ability, or the ability to perform activities of daily living (ADLs). Functional ability is generally at a lower level in the oldest old compared with the young old. Research suggests that about one fifth of young-old adults require assistance with at least one ADL, whereas about one third of the very old require assistance with at least one ADL.

Sensory functioning also tends to be at a lower level in the oldest old compared with young-old adults. Longitudinal studies have also found that most (70%) older adults tested for visual and hearing acuity at age 70 had no visual or hearing impairment, and there was no coexistence of visual and hearing impairment. When tested again at age 81, about 10% demonstrated normal visual or hearing, and about 5% demonstrated a coexistence of hearing and visual impairment. At age 88, none of the men and fewer than 10% of the women had normal hearing and vision, and 8% to 13% demonstrated coexistence. In addition, mild impairment was evident in only 0.5% of the sample when tested at age 70, but increased to 23% and 9% for visual and hearing acuity, respectively, at age 88.

PSYCHOLOGICAL CHANGES

The psychological functioning of the oldest old has also received increased attention recently. The most

commonly studied aspects of psychological functioning are cognitive abilities. Research suggests that cognitive decline in the oldest old differs from that in young-old adults in that it is more broad, more marked, less amenable to interventions, and more constrained by biological factors compared with cultural factors. For example, longitudinal research has found that the loss trajectory becomes markedly more negative after the age of 80 in terms of perceptual speed, memory, and fluency. Knowledge (e.g., vocabulary), on the other hand, tends to remain stable until about 90 years of age. Much of the variance in cognitive loss can be accounted for by sensory decline. This has been suggested by some researchers to represent an age-related slowing of the central nervous system (also referred to as the *common cause hypothesis*). Factors such as education, socioeconomic status, ethnicity, sex, and the presence of certain chronic conditions (e.g., diabetes, cardiovascular disease, Alzheimer's disease) also contribute to the heterogeneity of cognitive abilities in late adulthood. However, in general, old-old adults are more likely to be assessed as having lower psychological functioning than young-old adults.

Another research question is whether personality and self-identity remain stable into and throughout this stage. For example, it has been found that very old adults have a relatively stable sense of self, despite believing that some of their characteristics have changed. This suggests that there is a continuity of self into very late adulthood. Research has also found that self-esteem begins to decline in late adulthood. However, rather than being negative, this may represent an increased comfortableness and acceptance with one's self and personal faults. Finally, cross-sectional research examining stability of personality traits as measured by the revised NEO Personality Index (NEO-PI-R), found that the oldest old scored lower on extraversion and on the facet traits of impulsiveness, warmth, and positive emotions in relation to the young-old group, but were similar in terms of neuroticism, openness to experience, conscientiousness, and agreeableness, thus suggesting an overall stability of personality.

SOCIAL RELATIONSHIPS

It is widely recognized that as people enter later adulthood, their social networks tend to decrease in size. Activity theory suggests that this decrease is a result of factors such as decreased mobility, death of people in the social network, and other obstacles to social contact. In contrast, disengagement theory suggests that there is a mutual disengagement between society and old adults in preparation for impending death. However, recent research suggests that older adults are proactive in selecting their social partners in later life. Laura Carstensen's socioemotional selectivity theory posits that as people age, the importance of emotional support and regulation increases, while the salience of acquiring information decreases. Thus, older adults actively select relationships on which to focus their potentially decreasing resources in order to maximize the likelihood of positive experiences. Often this results in a decrease in the number of less close social contacts and stability in the relatively small, but very close and meaningful, social partners.

Another factor affecting social relationships in this age group is the high likelihood of being widowed. Because men have a shorter life expectancy, women are much more likely to be widowed and men are more likely to be married, thus providing men with a more salient source of social support.

EMOTIONAL CHANGES

Research has found conflicting results concerning changes in the experience and expression of emotion in very late adulthood. Some researchers suggest that because of increasing disability and role loss, the amount of negative affect experienced increases, whereas the amount of positive affect decreases. It has also been suggested that the experience of both negative and positive affect decreases because of less exposure to affect-inducing events or because of increased emotional regulation, and that positive affect increases and negative affect decreases as a result of older adults actively selecting situations that optimize the likelihood of experiencing positive affect. In a meta-analysis of the literature, it was found that negative affect does tend to increase and positive affect tends to decrease in the oldest old, and that the frequency and intensity of experiencing high-arousal emotions also decreases.

Research on depression in older adults generally suggests that age is not predictive of clinical depression, but depressive *symptoms* do tend to increase when transitioning into later life. Many researchers suggest that this increase is due to increased scores on negative symptoms and not decreased scores on items

assessing well-being. Also of interest is that the relationship of functional ability, cognitive impairment, and depression is often mediated by psychological resources (e.g., mastery). This suggests that it may not merely be the presence of disabilities that lead to depression, but the ways in which they are interpreted.

CONCLUSION

Because the population of people older than 85 years is the fastest growing population in terms of age groups, research examining this age period is becoming more important. Although researchers have identified trends, the heterogeneity of this age group cannot be underemphasized, thus increasing the need for longitudinal studies examining intraindividual change. Caution should also be taken when interpreting the results from studies examining the oldest old because participants typically represent a very positive selection of the population and of their cohort. Finally, because of the relationships between the aspects of aging discussed (e.g., sensory ability and cognition, social relationships and emotion), there is a need for multidisciplinary research to further explicate when and how these interactions occur.

—Brian J. Ayotte

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VIDEO GAMES

ORIGIN AND GROWTH OF THE VIDEO GAME INDUSTRY

The first interactive computer game, *Spacewar*, was written in 1961 by an MIT student named Steve Russell on a Digital Equipment PDP-1 computer. The first consumer video game, *Pong*, was released a decade later in 1972. Throughout the 1970s and into the 1980s, most video games were played in arcades (in this chapter, we define video games to include arcade games, computer games, and home console games such as PlayStation). Several recurring themes began to emerge at this time: multiple companies vied for market dominance, displacing older systems with each new technological advance; the popularity and cultural impact consistently grew over time; and concerns arose regarding the effects games might have. Concerns about video game violence first became highly salient in 1976 with the game *Death Race*, in which the goal was to drive a car over stick figures called "gremlins."

Currently, video game images are created out of many polygons; therefore, the number of polygons processed per second (pg/s) is a common measure of graphics quality. The Sony PlayStation, released

in 1995, processed 350,000 pg/s. Sega's Dreamcast, released in 1999, leaped ahead to more than 3 million. A year later, Sony's PlayStation 2 jumped to 66 million pg/s. One year after that, Microsoft's Xbox boasted 125 million pg/s. The stated goal for Sony's PlayStation 3 is 1 billion. At the same time, this increased speed and graphic capacity allowed for games to become more realistic, including far more realistic and graphic violence. Returning to an old theme, the top-selling video games from 2001 to 2003 were the *Grand Theft Auto* series, which included running down pedestrians with cars, and killing police, prostitutes, and others with a variety of weapons. The video game industry is now bigger than Hollywood, raking in more than $10 billion annually in the United States in 2002 and 2003. As games have taken up more of children's time and become more realistic and engaging, researchers have begun to study children's uses of video games and the varied effects they may have.

CHILDREN'S USE OF VIDEO GAMES AND SEX-CORRELATED DIFFERENCES

The amount of time children spend playing video games has increased over the past three decades. Considering both home and arcade playing in the mid-1980s, children averaged about 4 hours per week. By the early 1990s, home playing had increased and arcade playing had decreased, and sex-correlated differences had begun to emerge. Girls played an average of about 2 hours per week, with boys playing an average of 4 hours per week. In the mid-1990s, home play had increased for fourth-grade girls to 4.5 hours per week and 7.1 hours per week for boys. In 1999, school-age children (boys and girls combined) averaged 7 hours per week. Most recently in elementary and middle-school populations, girls are playing about 5.5 hours per week and boys average 13 hours per week. Perhaps surprisingly, the average amount of television watched has not dropped as video game playing time has increased.

It is still unclear at what age video game playing begins, but it is likely to be younger with each passing year. In a nationally representative survey, parents reported that children aged 2 to 7 play an average of 43 minutes per day. In studies of preschool children, even preschoolers aged 2 to 5 play an average of 28 minutes per day. It is also unclear when play peaks, if it does, and when it declines, if it does. Regardless of when children start playing, and whether there is a normative peak time, it is clear that gamers do not stop playing once they turn 18. The average age of a video game player has risen steadily, and is currently 29. It is important not to let this average mask the fact that video games have become ubiquitous in youth culture, with 92% of 2- to 17-year-olds playing.

Three sex-correlated differences have been found consistently across studies. First, males are more likely to play video games than females. Second, males are more likely to spend more time playing video games. Third, males prefer more violence in their video games. Most researchers define violence in games as when the player can intentionally harm other characters in the game. Content analyses show that most games contain some violent content, and about half of those include violence that would result in serious injuries or death. When asked, a majority of fourth- to eighth-grade children prefer violent games.

VIDEO GAME EFFECTS

Video games are natural teachers. Children find them highly motivating; by virtue of their interactive nature, children are actively engaged with them; they provide repeated practice; and they include rewards for skillful play. These facts make it likely that video games could have large effects, some of which are intended by game designers, and some of which may not be intended. We review several of these intended and unintended effects below, grouped into what could be considered "positive" and "negative" effects.

Positive Effects

The educational value of educational software and video games (known as *discrete educational software*) has been so widely accepted that such software is second only to word processing software in its availability and use in school classrooms. Although the quality of research in this domain varies widely, meta-analyses of recent high-quality studies of the efficacy of discrete educational software show an effect size of 0.38. That is, the average correlation between student use of educational software and student achievement is 0.38. The average correlation is 0.35 for educational games teaching reading skills and 0.45 for games teaching math skills. The efficacy for teaching prereading skills may be even greater than for teaching reading skills. The average correlation between educational software/games and reading skills is

0.44 for prekindergarten and kindergarten children.

Video games with other specific types of content have also shown positive effects. Video games have been used to teach children healthy skills for the self-care of asthma and diabetes and have been successful in imparting the attitudes, skills, and behaviors that they were designed to teach. In a study of college students, playing a golf video game improved students' actual control of force when putting, even though the video game gave no proprioceptive feedback on actual putting movement or force.

Some researchers have argued that video games are the "training wheels" for computer literacy. Computer literacy includes skills beyond traditional literacy skills, specifically iconic skills (image representation and manipulation). Research suggests that people can learn iconic, spatial, and visual attention skills from video games. For example, a study with college students to determine relative ability to keep track of several different things on a computer screen at the same time (a skill similar to those needed by flight controllers) concluded that expert video game players were better at maintaining divided visual attention than novices. In a second study, 5 hours of playing a video game led to increased response speed in the visual attention task, regardless of previous video game experience. Other studies have documented relations between video game play and visual selective attention, spatial visualization, mental rotation, and reaction times. Video games can also provide opportunities for practice in following directions and in the use of fine motor skills. There have even been studies with adults showing that experience with video games is related to better surgical skills.

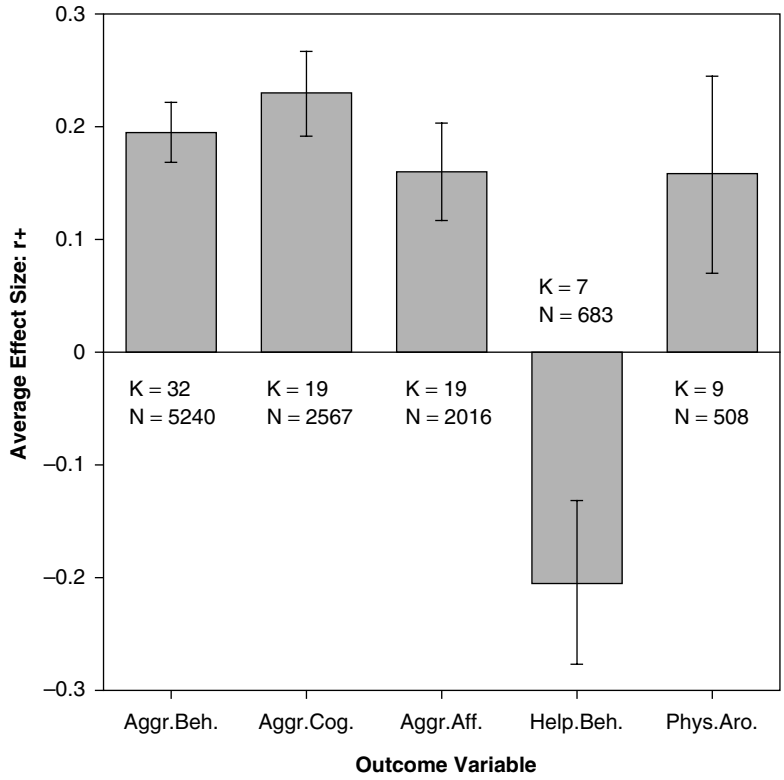

Figure 1 Effects of Violent Video Games on Aggressive Behavior, Aggressive Cognition, Aggressive Affect, Helping Behavior, and Physiological Arousal, All Samples

SOURCE: Anderson, C. A. (2004). An update on the effects of violent video games. *Journal of Adolescence, 27*, 133–122. Copyright by Craig A. Anderson and Academic Press. Reprinted by permission.

NOTES: K = number of independent samples. N = total number of participants. Vertical capped bars are the upper and lower 95% confidence intervals.

Negative Effects of Violent Video Games

Of several negative effects that have been studied, the one that has received the most attention is aggressive behavior. Dozens of studies have been conducted on the relation between playing violent video games and aggression-related variables. When analyzed using modern meta-analytic techniques, these studies show remarkably consistent results that are in line with theoretical predictions and with the much larger research literature on violent television and film effects. As can be seen in Figure 1, there are five major effects of playing violent video games.

1. *Violent video games increase physiological arousal*. Experimental studies show short-term increases in physiological arousal, such as heart rate and blood pressure.

2. *Violent video games increase aggressive cognitions*. Experimental and correlational studies show short-term and long-term increases in aggressive cognitions. Measures have included reaction times to

aggression-related and unrelated words, aggressive content of story completions, hostile attributions to ambiguous provocations, and aggressive completions of word fragments, among others.

3. *Violent video games increase aggressive feelings*. Experimental and correlational studies show short-term and long-term increases in aggressive affect, sometimes labeled *anger* or *state hostility*.

4. *Violent video games increase aggressive behaviors*. Experimental and correlational studies show short-term and long-term increases in aggressive affect. Aggressive behaviors have been measured in several ways, ranging from highly ecologically valid approaches such as physical fights at school to highly controlled (and internally valid) laboratory approaches such as attempts to deliver highly noxious noise blasts to a game opponent. These effects have been found in children and adults, and in males and females, in nonaggressive and highly aggressive individuals. In a recent longitudinal study of third to fifth graders, violent video game play was related to increases in verbally and physically aggressive behaviors even after controlling for sex, hostile attribution bias, amount of screen time, parental involvement, and prior aggression levels.

5. *Violent video games decrease prosocial behaviors.* Experimental and correlational studies show short-term and long-term decreases in positive or prosocial behaviors.

As may be seen from this meta-analysis, violent video games appear to be every bit as good at teaching aggressive skills as educational video games are at teaching reading skills.

Incidental Negative Effects

Several studies have documented relations between video game play and a wide array of other negative effects, most notably academic performance. This appears to be related to the amount of play more than the content of the games, in that students who spend a lot of time playing video games tend to get poorer grades.

There are also a number of concerns about the potential effects of heavy video game play on children's physical health, including obesity, video-induced seizures, and postural, muscular, and skeletal disorders such as tendinitis, nerve compression, and carpal tunnel syndrome. The causes for these types of disorders vary from posture at the computer to the repetitive nature of movements used with input devices (e.g., keyboards, mice, and joysticks). Most of the information on these types of disorders has been collected on adults. However, some have been documented in pediatric populations. In March 2000, Nintendo of America, a major video game manufacturer, acknowledged the problem by agreeing to provide protective gloves to about 1.2 million children because of numerous reports of hand injuries caused by the control stick of a particular game. Excessive video game playing has also led to documented cases of a form of tendinitis dubbed "Nintendinitis," caused by repeatedly pressing buttons with the thumb during game play.

Finally, some studies are beginning to document the existence of what appears to be video game "addiction." Studies suggest that perhaps as many as 15% to 20% of video game players could be considered "addicted" by criteria similar to the *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition *(DSM-IV)* criteria for gambling addiction. Although the correlates of video game addiction are only recently being investigated, it appears that this may be a growing problem.

SUMMARY

Children are becoming more engaged with video games as the technology advances and brings more realistic and exciting games into millions of homes. Partly because so many children play games for increasing amounts of time, researchers have begun to ask what the consequences of play may be. In short, video games appear to be excellent teachers. Many of the things they teach are intended (e.g., reading or math skills), but many are not (e.g., aggressive attitudes and behaviors, visual attention skills). Furthermore, the amount of time spent with video games may also have a negative impact on school performance and physical health for many children.

The question of whether video games are "good" or "bad" for children is oversimplified. Playing a first-person shooter game for hours every day could have a negative effect on school performance, a negative effect on aggressive behaviors, and a positive effect on visual attention skills. We prefer to recognize that video games can have powerful effects on children, for good or ill.

—Douglas A. Gentile and Craig A. Anderson

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VIOLENCE

Violence is an act of physical force or threat of force that causes damage or is intended to produce harm. The damage inflicted by violence may be physical, psychological, or both. Violence may be distinguished from aggression, a more general type of hostile behavior that may be physical, verbal, or passive in nature.

TYPES OF VIOLENCE

Violence can be categorized in a number of ways. Violent crimes are typically divided into four main categories, based on the nature of the behavior: homicide (intentionally ending the life of another person), assault (attacking another person with the intent to cause harm), robbery (forcibly taking something from another person), and rape (forcing someone to engage in sexual activity). Other forms of violence overlap with these categories, such as child sexual abuse (engaging in sexual acts with a child) and domestic violence (violent behavior between relatives, usually spouses).

Violence can also be categorized according to the motivation for it. Reactive, or emotional, violence typically involves the expression of "hot-blooded" anger—a hostile desire to hurt someone—that arises in response to perceived provocation. Proactive, or instrumental, violence is more "cold blooded" and calculated, done in anticipation of a reward. Psychologist Kenneth Dodge found that these two types of violence involve distinct physiological states: a person engaging in reactive violence experiences increased autonomic nervous system arousal (i.e., increased heart rate and breathing, sweating), whereas a person committing an act of proactive aggression experiences low autonomic arousal.

Another method of categorizing violent behavior involves distinguishing between predatory and affective violence. Predatory violence involves planned acts of hostile force. Affective violence is more impulsive and unplanned. Other types of violence have been suggested, including irritable (motivated by frustration), territorial (motivated by intrusion into one's perceived territory or space), fear-induced (motivated by fear), and maternal (motivated by a threat to one's child) violence.

FREQUENCY OF VIOLENT BEHAVIORS

Since the time of early civilizations, violence has occurred throughout the world, in forms ranging from war between countries to individuals behaving violently toward other individuals. In recent decades, rates of violent crimes committed by individuals have been documented by the United Nations. Although every country experiences violence, rates of violence (calculated as the number of crimes per 100,000 people) vary considerably across countries. For example, in 2000, the reported homicide rate was relatively low in countries such as Greece (0.76), Japan (0.50), Pakistan (0.05), and Switzerland (0.96). Much higher homicide rates were reported that year in Colombia (62.74), Jamaica (33.69), Russia (19.80), and South Africa (51.39). In 2000, the homicide rate in the United States was 5.5 per 100,000 people. In the United States, 1,426,325 violent crimes were reported to the police in 2002; the violent crime rate that year was 494.6 per 100,000. Assaults accounted for the largest proportion (62.7%) of reported violent crimes in the United States, followed by robbery (29.5%), rape (6.7%), and homicide (1.1%). These rates do not account for all violence that occurs in the United

States, however. The Department of Justice's National Criminal Victimization Survey indicates that a large number of violent crimes are not reported to the police. Assault seems to be the most frequently underreported act of violence, with 79% of assaults not reported to police in 2002. Sixty-two percent of rapes were unreported that year, whereas only 8% of robberies were not reported to police.

The frequency of violent behavior changes across the life span. Very young children (i.e., younger than 8 years) are least likely to engage in serious violence. Older children show some violence, but less than adolescents. Older adolescents and young adults (i.e., 16 to 25 years of age) are more violent than any other age group. Beyond the 20s, the frequency of violence decreases steadily with age. To see changes in violence over the life span, consider homicide as an example. A few very young (i.e., under 8 years) murderers exist, with rates increasing slightly with age until a noticeable increase occurs in the 13- to 16-year-old age group. The homicide rate peaks in the 20- to 24-year-old age group, and then declines steadily with age.

Gender differences exist in the rates of violent crime in the United States. Males are much more likely than females to behave violently. The victims of violent crimes such as homicide and assault are also more likely to be males. Rape victims are most likely to be females, though, as are the victims of domestic violence.

CAUSES OF VIOLENCE

With so much violence occurring all over the globe, it is natural to wonder what causes people to behave violently. Researchers have been attempting to answer this question by examining a variety of possible causal factors. The one point that all researchers seem to agree on is that violence is multicausal, meaning that no single factor is responsible for violent behavior. Instead, violence results from a combination of variables within a person, factors in the social or cultural environment, and immediate situational forces. Researchers have examined multiple factors within a person that may contribute to violence, including genetic predisposition, neurochemical abnormalities (e.g., high testosterone levels), personality characteristics (e.g., lack of empathy for others), information-processing deficits (e.g., tendency to view others' actions as hostile), and experiencing abuse or neglect as a child.

EFFECTS OF VIOLENCE

Regardless of its cause, violence has a negative impact on those who witness or experience it. Violence can cause physical damage as well as psychological harm. Several psychological disorders, including posttraumatic stress disorder, dissociative identity disorder, and borderline personality disorder, are associated with experiencing or witnessing violence. Other psychological symptoms, such as depression, anxiety, and mood swings, are common in victims of violence.

Children seem to be particularly susceptible to the negative effects of violence. Children who experience or witness violence may develop a variety of problems, including anxiety, depression, insecurity, anger, poor anger management, poor social skills, pathological lying, manipulative behavior, impulsiveness, and lack of empathy. As these examples show, some children may respond to violence in "internalizing" ways, such as feelings of insecurity, anxiety, and depression, whereas others may react in "externalizing" ways, such as feeling angry and behaving in an antisocial manner. Although some of the effects of violence may manifest during childhood, others may not appear until adulthood. For example, abused girls are more likely than nonabused girls to have substance abuse problems as adults.

Exposure to violence can also increase violent behavior in children. Psychologist Albert Bandura showed that children often imitate violent behaviors, especially if those acts are committed by trusted adults (e.g., parents). Children also imitate violence shown on television and in other forms of media. Children exposed to greater amounts of media violence are more likely than other kids to become violent adults. This is particularly true if the child identifies with the violent characters and if the child believes that media violence represents reality.

PREVENTION OF VIOLENCE

Once a person engages in violent behavior, the likelihood of future violence is quite high. Of those individuals convicted of a violent crime, a large proportion of them reoffend if released from prison. Research also suggests that many arrestees commit several violent crimes before being arrested for the first time; for example, the average rapist rapes seven women before being caught. As a result of these high rates of reoccurrence of violence, mental health

professionals have recognized the need to develop effective violence prevention programs.

Because the tendency to behave violently develops during childhood, most prevention programs target young people. Many of these programs are school based, although some involve the family or the community. The most successful violence prevention programs are those that target all children, not just those who are considered to be at risk for violence. In addition, the most success has been found in school-based programs with committed and involved teachers and programs that include parent training.

An example of an effective school-based violence prevention program is the Resolving Conflict Creatively Program, developed in the New York City public schools. This program includes the training of teachers and students in conflict resolution, problem-solving lessons for students aimed at promoting nonaggressive choices, and peer mediation to facilitate conflict resolution. Effective community-based programs include those that provide children with positive after-school activities and nonviolent role models. Family-based prevention is most successful if the parents are taught to be firm, clear, and understanding and to use nonviolent methods of discipline.

A variety of programs have been developed to reduce or prevent violence in individuals who have already shown a tendency toward violence. For example, a number of prison-based programs attempt to reduce the likelihood of reoffending among violent and nonviolent criminals. These programs often involve a variety of components. Violent offenders may receive training to improve parenting and other relationship skills. A mental health component may be included, such as substance abuse treatment. Job training is another common component of prison-based prevention programs. Occasionally, drugs such as antidepressants, beta-blockers, and benzodiazepines may be used in addition to other methods. Overall, the most successful programs for preventing future violence are those that teach behavioral changes.

SUMMARY

Violence is a relatively common type of human behavior that occurs throughout the world. People of all ages may be violent, although older adolescents and young adults are most likely to engage in violent behavior. Violence has a number of negative effects on those who witness or experience it; children are especially susceptible to its harm. Fortunately, various programs have been successful at preventing and reducing violence.

—Kristine M. Jacquin

See also Firearms, Injuries, Rape

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VISUAL CLIFF

The visual cliff, designed by Richard D. Walk and Eleanor J. Gibson, is an apparatus used for testing depth perception of human infants and animals. Visual cliffs are constructed by placing patterned surfaces (e.g., checkerboard) on each side of a central platform. Both surfaces are covered by a sheet of glass. One surface is directly beneath the sheet of glass, however, whereas the other surface is dropped several feet below the glass. This creates shallow and deep "visual cliffs" on the opposing sides. Organisms are placed on the platform of the apparatus and allowed to locomote or are coaxed toward the deep cliff.

Early research using the visual cliff found that a variety of species, including rats, cats, goats, and human infants, avoided the deep cliff as soon as they could locomote independently. This avoidance was interpreted as evidence that the organism could perceive the depth or height of the cliffs. The findings that avoidance occurred early in development for most species, when the animals had little motor or perceptual experience, was also interpreted as supporting that this avoidance or wariness was innate or independent of experience.

Subsequent research has offered alternative interpretations for the avoidance response of human infants. Nancy Rader and John E. Richards presented a maturational interpretation of the avoidance response, arguing that the initial avoidance seen in early infancy is not based on fear, but on a response-specific visual-motor program. Their research provided evidence that avoidance behavior is predicted by crawling onset age. Additionally, infants avoided the deep side of the cliff when crawling but not when placed in a walker, suggesting that avoidance does not reflect a generalized fear response to heights.

An experiential interpretation of infant avoidance reactions, presented by Joseph J. Campos, Bennett I. Berthenthal, and colleagues, argued that infants' avoidance does reflect their wariness of heights and that this wariness is related to self-produced locomotion. This research revealed that wariness and avoidance of depth are related to amount of independent locomotion and that wariness is accelerated in infants who are not yet crawling but who have experienced "artificial" locomotion through use of walkers. This research measured infants' behavioral avoidance responses and their heart rate responsiveness when placed over the deep and shallow cliffs. Accelerative heart rate responsiveness, which indicates fear or wariness, was related to locomotor experience. Decelerative heart rate responses, indicating attentional responses but not fear, were recorded in prelocomotor infants. These decelerative responses indicated that precrawling infants could detect differences in depth, but were not yet responding to depth with wariness. According to Campos and colleagues, several processes may underlie the development of wariness. As infants begin coordinating crawling with goal-directed behaviors, the infants may fall, resulting in negative affect becoming associated with these situations. Infants also experience negative emotional reactions of their parents in situations in which they are likely to fall. These experiences contribute to their wariness of situations involving depth or height. Additionally, as infants acquire crawling experience, they coordinate normally co-occurring visual and vestibular inputs. Wariness is experienced when visual and vestibular cues do not match, such as being lowered over the edge of a surface (e.g., the deep cliff). This experiential interpretation of human infants' depth perception and avoidance reactions is consistent with accumulating data from studies of nonhuman species (e.g., cats, rats, chicks) that depth perception and avoidance of depths is dependent on specific types of visual and locomotor experiences.

—Melanie J. Spence

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VITAMIN DEFICIENCY

Vitamins are organic *substances* needed for their catalytic activities and cannot be synthesized by humans. They are essential to body metabolism and bioactivities.

FAT-SOLUBLE VITAMINS

Vitamin A

There are three forms of vitamin A: retinols, which are found in animal sources of food; beta-carotene, which is the plant source of retinol from which mammals make two thirds of their vitamin A; and carotenoids. Vitamin A is the third most common

nutritional deficiency worldwide and is also seen in patients with disorders associated with fat malabsorption.

Vitamin A deficiency can affect the eyes, causing night blindness, complete blindness, and xerophthalmia; less common are Bitot's spots, corneal perforation, keratomalacia, and punctate keratopathy. For the skin, hyperkeratosis, phrynoderma, and destruction of hair follicles can result from vitamin A deficiency. Immunity-related effects include impairment of the humoral and cell-mediated immune system through effects on the phagocytes and T cells.

Vitamin D

Vitamin D is found in fortified milk, fatty fish, cod-liver oil, and eggs. When there's deficiency in vitamin D, reduced intestinal absorption of calcium and phosphorus and demineralization of bones leads to osteoporosis in adults and rickets in children. Hypocalcemia causes a secondary hyperparathyroidism that leads to bone resorption and osteomalacia.

Vitamin E

Vitamin E is an antioxidant that protects cell membranes from destruction. Vitamin E deficiency occurs in patients with disorders associated with fat malabsorption. Neuromuscular disorders associated with vitamin E deficiency include skeletal myopathy, spinocerebellar ataxia, and pigmented retinopathy. Some studies suggest an association between development of Alzheimer's disease and vitamin E deficiency. In premature infants, hemolytic anemia is encountered in the presence of vitamin E deficiency. Congenital hemolytic disorders may be associated with low vitamin E plasma levels.

Vitamin K

The name *vitamin K* comes from the German/Danish word koagulationsvitamin (clotting vitamin). Dietary vitamin K1 (phylloquinones) is found in green vegetables such as spinach and broccoli. Gut microflora synthesize vitamin K2 (menaquinone). Vitamin K deficiency leads to impaired coagulation manifested by easy bruisability, mucosal bleeding, and melena. Hemorrhagic disease of the newborn is due to an immature liver, low vitamin K content of breast milk, a sterile gut, and poor placental transfer of vitamin K.

WATER-SOLUBLE VITAMINS

Vitamin B_1 (Thiamine)

Thiamine serves as a catalyst in the conversion of pyruvate to acetyl coenzyme A. Deficiency of thiamine is associated with beriberi. Infantile beriberi is clinically apparent between the ages of 2 and 3 months, manifested as fulminant cardiac syndrome with cardiomegaly, tachycardia, a loud piercing cry, cyanosis, dyspnea, and vomiting. For adults, dry beriberi is a symmetrical sensory and motor peripheral neuropathy. Wet beriberi includes a neuropathy and cardiac involvement with cardiomegaly, cardiomyopathy, and congestive heart failure.

Wernicke-Korsakoff syndrome is largely described in chronic alcoholics. Wernicke's disease is a triad of nystagmus, ophthalmoplegia, ataxia, and confusion. Korsakoff's psychosis is impaired short-term memory and confabulation with otherwise grossly normal cognition.

Leigh's syndrome is a subacute necrotizing encephalomyopathy, leading to symmetrical foci of spongy necrosis and demyelinating changes in the thalami, brain stem, pons, and even peripheral nerves. It is manifested with ataxia, dysarthria, movement disorders, areflexia, muscle atrophy, and weakness.

Vitamin B_2 (Riboflavin)

Riboflavin is an essential component of coenzymes involved in multiple cellular metabolic pathways. Riboflavin deficiency is often accompanied by other water-soluble vitamin deficiencies in patients with anorexia nervosa, malabsorptive syndromes, rare inborn errors of metabolism, and long-term use of barbiturates. It is characterized by sore throat, cheilitis, stomatitis, glossitis, normocytic-normochromic anemia, and seborrheic dermatitis.

Vitamin B_3 (Niacin)

Nicotinic acid and nicotinamide are the two common forms of the vitamin most often referred to as niacin. Niacin occurs in alcoholics and in poorer countries where diet intake is inadequate. It is associated with carcinoid syndrome, prolonged use of isoniazid, and Hartnup's disease. It manifests as a symmetric hyperpigmented rash on exposed areas of skin, a red tongue, diarrhea and vomiting, insomnia, disorientation, delusions, dementia, and encephalopathy.

Vitamin B_5 (Pantothenic Acid)

Vitamin B_5 is an essential cofactor in many acetylation reactions. It is found mainly in egg yolk, liver, broccoli, and milk. Deficiency of vitamin B_5 is mainly seen in severely malnourished individuals. It is manifested by paresthesias and dysesthesias, referred to as *burning feet syndrome.*

Vitamin B_6 (Pyridoxine)

Meats, whole grains, vegetables, and nuts are the best sources of vitamin B_6. Deficiency is usually manifested as nonspecific stomatitis, glossitis, cheilosis, irritability, confusion, and depression. It can lead to elevations in plasma homocysteine concentrations, a risk factor for the development of atherosclerosis and venous thromboembolism.

Vitamin B_{12} (Cobalamin) and Folic Acid

Cobalamin and folate deficiency share many similarities. Animal products provide the only dietary source of cobalamin for humans. Folate comes from animal products and leafy vegetables. Cobalamin deficiency is usually a result of inadequate absorption associated with pernicious anemia or gastric disease and also occurs in elderly people.

Hematologic

Megaloblastic anemia presents with symptoms of anemia, atrophic glossitis, and mental sluggishness.

Neurologic

Subacute combined degeneration of the dorsal and lateral spinal columns is characteristic. Neuropathy, paresthesias and ataxia, and loss of vibration and position sense can progress to severe weakness, spasticity, clonus, or paraplegia.

Folate deficiency is due to poor diet, alcoholism, elderly age, and drug-induced (e.g., trimethoprim, methotrexate, and phenytoin) interference with folate metabolism. There is an increased requirement in pregnancy and lactations and in patients with hemolytic anemias and exfoliative skin disease. The hematologic manifestations are similar to those of cobalamin deficiency, without neurologic abnormalities.

Hyperhomocysteinemia

Deficiencies in these vitamins can lead to elevations in plasma homocysteine levels, which is a risk factor for the development of atherosclerosis and venous thromboembolism.

Biotin

Biotin is found in yeast and liver. Biotin functions as a cofactor to the carboxylase enzyme. In the setting of biotin deficiency, pyruvate levels rise and are converted to lactic acid. Nonspecific symptoms may include changes in mental status, myalgia, anorexia, and nausea. Chronic deficiency can lead to maculosquamous dermatitis of the extremities, seborrheic dermatitis, and alopecia.

Multiple carboxylase deficiency is manifested by a slow but progressive loss of biotin in the urine, leading to the typical organic aciduria of multiple carboxylase deficiency. The neonatal type is seen in the first week of life, and the late onset type is generally seen before 1 year of age.

Vitamin C

Vitamin C functions as a cofactor, enzyme complement, cosubstrate, or a strong antioxidant in a variety of metabolic processes. Vitamin C deficiency is related to scurvy. Scurvy is a clinical syndrome, largely due to impaired collagen synthesis. It occurs mostly in severely malnourished individuals, drug and alcohol abusers, or with inadequate oral intake. Symptoms include ecchymoses, bleeding gums, petechiae, hyperkeratosis, and impaired wound healing.

—Carroll B. Leevy and Hany A. Elbeshbeshy

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VOLUNTEERING

Volunteering is a term used to describe a broad range of helping behaviors intended to benefit a variety of recipients, including large organizations, smaller groups of disadvantaged individuals, and even family members, neighbors, and friends. There are many ways to help others, such as by donating money or time (instrumental help) or by being willing to listen if another person needs to talk (emotional support). Emerging life-span perspectives on volunteerism and service emphasize the importance of providing help to others for feeling useful, especially in older age.

Recent evidence within behavioral medicine, epidemiology, and health psychology suggests that volunteerism and helping others may be an important part of why social relationships are beneficial to the health of older adults. Volunteerism has been shown to improve physical and mental health, and the act of helping others has been shown to reduce distress and improve satisfaction within interpersonal relationships. Among elderly populations, providing support to others improves physical functioning and promotes longevity. For example, a prospective study of bereavement and mortality demonstrated that older adults who provided tangible forms of assistance (e.g., help with child care, transportation, errands) to friends, relatives, and neighbors were between 40% and 60% less likely to die during a 5-year period, compared with individuals who did not provide this type of assistance to others. Furthermore, providing emotional support to a spouse (e.g., making a spouse feel loved and cared for) was also protective, leading to a 30% lower chance of mortality risk during the same period. Individuals who reported receiving support from others (e.g., feeling loved and cared for by a spouse or other family members) did not have a similar decrease in their mortality risk.

Added to the direct health benefits shown to be associated with volunteering and helping others, indirect evidence links perceptions that may be associated with volunteering, such as a sense of meaning, purpose, belonging, mattering, self-efficacy, and self-esteem, to happiness and reduced depression. These benefits of volunteering and related feelings may reflect the fact that there are adaptive, evolutionary benefits of helping others. For example, kin selection and reciprocal altruism theory suggest that helping others is necessary to ensure inclusive fitness—our own reproductive success plus the reproductive success of individuals who share our genes. Helping others would have maximized inclusive fitness either by enhancing the welfare of relatives who would survive and pass on common genes or by enhancing the welfare of reciprocal altruists who would survive and direct future acts of altruism toward the helper or toward individuals who share the helper's genes.

Both kin selection and reciprocal altruism theory specify the circumstances that altruism could have evolved; however, they do not address the motivational mechanisms that would have impelled individuals to give away their own valuable resources to help others. Selective investment theory was advanced to address the motivational basis for allocating valuable resources to others on a long-term basis, and even in the absence of reciprocity. According to selective investment theory, giving, and not receiving, is the evolutionary function of interpersonal relationships that are characterized by a social bond. Other evolutionary theories of relationship processes have made similar arguments, suggesting that emotional commitments between individuals may have evolved, in part, to promote altruism.

These evolutionary theories of altruism and close relationships have important implications for volunteering. Most notably, they suggest that individuals will be more motivated to volunteer, and may provide the most help to another person, when there exists the potential to develop a personal relationship with the recipient. The possibility that interpersonal relationship processes play an important role in stimulating and maintaining volunteerism is a new area of research that awaits further study.

—Stephanie L. Brown

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VYGOTSKY, LEV (1896–1934)

Born in 1896 in Orsha, Byelorussia, Lev Semenovich Vygotsky is best known for his sociocultural approach to human development, a very influential set of ideas about how the child's social world and culture affect development. His ideas about how children develop within sociocultural context, now required reading for contemporary scholars of psychology and education, were themselves a reflection of the cultural-historical context of his time—namely Marxist socialism of early 20th-century revolutionary Russia.

Vygotsky's early life experiences were constrained by the limited opportunities afforded to Jewish families at that time. He grew up in the city of Gomel and went to a combination of public and private schools for his education. Vygotsky studied law at Moscow University and also enrolled in the "unofficial" Shaniavsky People's University. After graduation, Vygotsky returned to Gomel, where he taught at Gomel's Teacher's College. Following his marriage to Roza Smekhova and the birth of his daughter Gita, Vygotsky moved to Moscow, where he began his career as a researcher and psychologist and where he started his fruitful collaboration with students A. R. Luria and A. N. Leont'ev.

Vygotsky maintains that what is unique about human development is that it occurs through the internalization of language and cultural tools and symbols. All higher-order cognitive abilities first appear socially in interactions between people and then become part of children's individual mental lives. Language is seen as the primary cultural tool that children internalize as private speech (self-talk) to guide their own thinking and behavior. Because different cultures have different languages, customs, and primary activities, children's cognitive and behavioral development can be very different across cultures.

Vygotsky's contributions to educational and psychological practice include the notions that (a) instruction should take place in the zone of proximal development (ZPD), a hypothetical region defined by the distance between what a child can accomplish alone and what the child can do with the help of someone else; (b) child assessment should be dynamic (done over time, examining cognitive changes due to teaching) rather than static (standardized individual tests); and (c) that children with special needs should be exposed to as normal social interactions and environments as possible.

The fundamentals of Vygotsky's theory appear in *Thought and Language* and in *Mind in Society*. Vygotsky frantically wrote as much as possible before his untimely death from tuberculosis in 1934. His 180 works had not begun to be translated into English until the 1960s, and his complete works in English were not available until 1999.

—Erin McClare and Adam Winsler

See also Scaffolding, Zone of Proximal Development (ZPD)

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W

Work

Far and away the best prize that life offers is the chance to work hard at work worth doing.

—Theodore Roosevelt

WATSON, JOHN B. (1876–1958)

John Broadus Watson was born a poor rural boy from Traveler's Rest, South Carolina, raised by his mother in urban Greenville, at a time when American Progressivism was making a university education and graduate specialization a means for individual, social, and cultural advancement. He received a master's degree in philosophy from Furman University (1899) and achieved the University of Chicago's first PhD in psychology (1903). He was then an instructor at Chicago (1903–1908) and a professor at Johns Hopkins University (1908–1920), but a scandal forced him to leave academe. Undeterred, he became the first "pop" psychologist and a successful advertising executive in New York City (1921–1945).

Watson began as an animal and comparative psychologist, where some of his research was the earliest and best work in ethology. For this, experimental psychology had to be the study and science of behavior, not the then-standard introspection of conscious contents ("Psychology as the Behaviorist Views It," 1913). The former became Watson's classic behaviorism, which was taken seriously because of the high regard in which his research was held. Indeed, his stature was such that he became the editor and founder of prestigious journals (e.g., P*sychological Review, Journal of Experimental Psychology*) and president of the American Psychological Association.

As a systematist, Watson held that psychology's goal was to formulate the laws and principles of human behavior through systematic observation and experimentation (*Psychology from the Standpoint of a Behaviorist*, 1919, 1929). For this, he advanced prediction and control as a means for understanding behavior, promoting behaviorism, and advancing cultural change. He adopted the conditioned reflex as a basic principle of behavior. He analyzed thinking, feeling, and imagining as implicit responses, not as independent mental processes. And, he viewed anatomy and physiology, not instincts, as the biological basis of human behavior (*Behaviorism*, 1924, 1930).

In extending his science to human development, Watson focused on infancy and early childhood. He made groundbreaking observations of normative emotional development. He pioneered in studying conditioned emotional reactions and their elimination. Watson published articles in the popular press on childrearing (e.g., *Cosmopolitan*), culminating in *Psychological Care of Infant and Child* (1928). Here, he was an early opponent of corporal punishment and

an advocate for sex education, but advised unwisely about emotional attachment. His advice, though, was not based on classic behaviorism, but was more personal. Empirically validated child-rearing advice would await the emergence of human development as a science.

—Edward K. Morris

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WECHSLER ADULT INTELLIGENCE SCALE (WAIS)

The Wechsler Adult Intelligence Scale (WAIS) measures intellectual ability in 16- to 89-year-olds. The first version of the WAIS was released in 1955. The WAIS-III, released in 1997, is the most recent version. The WAIS is currently the most widely used, individually administered adult intelligence test in the world.

The WAIS is one of three Wechsler intelligence scales. The others are the Wechsler Preschool and Primary Scale of Intelligence, for 2.6- to 7.3-year-olds, and the Wechsler Intelligence Scale for Children, for 6- to 16-year-olds.

The WAIS is divided into two major subscales: Verbal and Performance. The Verbal scale measures verbal knowledge, verbal reasoning, and attention to verbal materials. It includes seven subtests: Arithmetic, which measures the ability to perform arithmetic operations; Comprehension, which measures the understanding of practical and social issues; Digit Span, which measures memory for digits; Information, which measures knowledge of factual information; Letter-Number Sequencing, which measures sequential memory for digits and letters; Similarities, which measure the ability to infer relationships between concepts; and Vocabulary, which measures the ability to define words.

The Performance scale measures fluid reasoning, spatial processing, attention to detail, and visual-motor coordination. It includes seven subtests: Block Design, which measures the ability to build a model with blocks; Digit Symbol-Coding, which measures the ability to learn a code of digits and symbols; Matrix Reasoning, which measures the ability to infer a rule in a sequence of geometric shapes; Object Assembly, which measures the ability to assemble a puzzle; Picture Arrangement, which measures the ability to sequence pictures to tell a story; Picture Completion, which measures the ability to identify a missing element in a picture; and Symbol Search, which measures the ability to identify a target symbol within a group.

The WAIS provides normative, age-corrected intelligence quotient (IQ) scores for the Verbal and Performance scales. It also provides a full-scale intelligence quotient (FSIQ) score, which measures general mental ability. By convention, the average FSIQ within an age group is set at 100 and the standard deviation is set at 15.

In addition to the IQ scores, the WAIS provides four index scores of specific cognitive processes. The Verbal Comprehension index measures verbal knowledge and reasoning. The Perceptual Organization Index measures fluid reasoning, attention to detail, and visual-motor coordination. The Working Memory Index measures the ability to hold and manipulate information in memory. The Processing Speed Index measures the ability to process information quickly.

The psychometric properties of the WAIS are excellent. The test–retest stability of WAIS FSIQ (retest interval: 2–12 weeks) is extremely high for 16- to 89-year-olds ($r = 0.95$, corrected for the variability of the standardization sample). The internal consistency reliability of test items used to compute WAIS FSIQ is also extremely high for 16- to 89-year-olds ($r \geq .97$).

Intercorrelations among the WAIS subtests are almost always positive. This indicates that all the WAIS subtests measure the same latent construct, which has been labeled *g*. The *g* loading of a WAIS subtest (i.e., the correlation between the subtest and *g*) can be determined using factor analysis. Factor analysis shows that some WAIS subtests have relatively high *g* loadings (Vocabulary and Block Design), whereas others have relatively low *g* loadings (Digit Span and Digit Symbol-Coding).

The pattern of WAIS subtest and index scores is related to a number of psychological disorders,

including mental retardation, attention deficit hyperactivity disorder, reading and math learning disabilities, Parkinson's disease, traumatic brain injury, and schizophrenia. The WAIS scores are also related to cognitive tests of academic achievement (Wechsler Individual Achievement Test), attention and concentration (Trail-Making Test), memory (California Verbal Learning Test), fine motor dexterity (Grooved Pegboard), and executive functioning (Wisconsin Card Sorting Test).

—Thomas R. Coyle

See also Intelligence, Multiple Intelligences

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WECHSLER INTELLIGENCE SCALE FOR CHILDREN (WISC)

The Wechsler Intelligence Scale for Children (WISC) was developed in 1949 by David Wechsler to be an individually administered assessment of the cognitive abilities of children aged 5 through 15. The WISC was initially a downward extension of Wechsler's adult intelligence test, the Wechsler-Bellevue Intelligence Scale (WBIS, 1939). The WBIS provided a measure of verbal, performance, and overall intelligence by using 12 subtests. Wechsler retained 11 of these subtests for the WISC and added an additional subtest (mazes) as a means of assessing a child's planning and perceptual abilities. The other 11 subtests are Information, Arithmetic, Similarities, Vocabulary, Digit Span, Comprehension, Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding.

Since its initial publication, there have been three revisions of the test in order to meet changing testing needs and to reflect current research. In 1974, the WISC-R was published with some updated test items while retaining the original 12 subtests. The age range was increased to cover ages 6 through 16. The WISC-III, released in 1991, retained the original 12 subtests with a few updated test items and also added a new subtest, Symbol Search, as a means of assessing perceptual discrimination, processing speed, and freedom from distraction. Some additional changes to the test makeup were performed with the newest revision, the WISC-IV, released in 2003. The addition of three new subtests, Matrix Reasoning, Cancellation, and Picture Concepts, and the elimination of the Mazes subtest brought the total number of subtests to 15. Yet, throughout the changes and editions of the test, the basic goals have remained the same: to be able to assess the child's general intellectual ability (full-scale intelligence quotient [FSIQ]) as well as other more specific cognitive domains (Index Scores).

In previous editions of the test, the individual's performance was divided into verbal and performance (nonverbal) measures of intelligence. This separation did not reflect a belief in different forms of intelligence, but rather reflected different means of measuring the one underlying general level of intelligence (Spearman's *g*). However, the WISC-IV focuses on measuring more specific cognitive domains represented by the four indices—Verbal Comprehension, Working Memory, Perceptual Reasoning, and Processing Speed—in addition to the overall FSIQ score. Each index is composed of subtests that collectively measure a specific cognitive domain. The Verbal Comprehension Index is composed of Similarities, Vocabulary, and Comprehension. The Perceptual Reasoning Index is composed of Block Design, Picture Concepts, and Matrix Reasoning. The Working Memory Index includes Digit Span and Letter-Number Sequencing, whereas the Perceptual Speed Index has Coding and Symbol Search.

Upon completion of the WISC-IV, an FSIQ score can be derived. Historically, an IQ score was the ratio (or quotient) of an individual's mental age (MA) to her or his chronological age (CA), as shown below.

$$IQ = \frac{\text{MA}}{\text{CA}} \times 100$$

Today, instead of using the quotient method, standard scores are derived by comparing an individual's score with a set of normative scores within the individual's age range. Thus, the FSIQ represents the child's ability in relation to her or his peers. The average FSIQ score is 100, with 68% of scores falling between 85 and 115; 95% of scores range from 70 to 130. Standard scores are often represented as percentile rankings. Someone with a standard score of 100 would have a percentile ranking of 50%, meaning that the child scored greater than or equal to 50% of her or his peers.

The WISC-IV is used in clinical, counseling, and school settings to assess the cognitive abilities and deficits of children. Many institutions use this instrument to assess for admittance into "gifted" programs and to assist in the diagnosis of learning disabilities or mental retardation.

—Peter K. Stewart and Ric G. Steele

See also Intelligence, Multiple Intelligences

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WEIGHT

Weight refers to the amount or quantity of heaviness or body mass, that is, the force that gravity exerts on an individual or thing. A person's body weight includes the heaviness of the skeleton, muscles, bodily fluids (e.g., blood, water), internal organs, and adipose (i.e., fat) tissue that surrounds and protects the bone and organs. Adipose tissue (also known as *body fat*) also stores energy for later use. Without fat cells, people could not afford to skip a meal; thus, famine or illnesses that interfere with appetite would lead to certain death.

Height and weight are correlated. As human bodies grow and develop, they generally increase in both stature and mass. Failure to thrive, malnutrition, and metabolic disorders are among the reasons infants might not gain weight, and all are obvious reasons for concern. The rate at which infants gain weight varies. It depends not only on the infants' general health and the amount of food they are offered but also on genetic differences in metabolic rate and the initial size and number of their fat cells. As children grow, their activity levels also affect their body weight, as some use more of their energy stores than others.

There are certain times in human development when people are more or less prone to add fat cells or for existing cells to increase in size. For example, boys' percentage of body fat tends to increase during prepubertal phases of development and to decrease during the adolescent growth spurt (i.e., they become leaner following puberty). In contrast, girls' percentage of body fat is relatively stable in childhood, but increases during the adolescent growth spurt. Between ages 10 and 15, on average, the percentage of body fat in boys decreases from 17.8% to 11.2%, and the percentage in girls increases from 16.6% to 23.5%. Girls' pubertal increase in body fat is a necessary prerequisite for menarche, the initiation of the menstrual cycle. Other reproductive milestones (e.g., pregnancy, menopause) also result in weight gain for women. Epidemiologic studies indicate that between the ages of 20 and 50, men's percentage of body fat doubles and women's percentage increases by about 50%. Furthermore, metabolic rate slows as people age. Therefore, if older people do not cut their caloric intake below levels that were typical for them at midlife, they are likely to gain weight. Chronic illness or disability may result in decreased activity level, which also increases the likelihood of weight gain.

There is considerable evidence to support what scientists call the *set-point hypothesis*, that is, the idea that all animals (including humans) are designed to maintain their weight within a certain genetically programmed range, the middle of which is known as the set-point. The system works much like the thermostat connected to a furnace. If people increase their activity levels, the brain increases their appetites and slows down their metabolism so that their body weight will remain about the same. Similarly, if people increase their eating or decrease their activity levels, the brain increases the metabolic rate and decreases appetite in an attempt to maintain the "preferred" weight range. The set-point moves during growth and development to accommodate the changes described earlier. It may also move or become inefficient if the system is dysregulated by, for example, binge-purge behavior, yo-yo dieting, medication side effects, or metabolic disorders.

CONSEQUENCES OF SIGNIFICANT WEIGHT LOSS OR GAIN

Failure to thrive and undiagnosed metabolic disorders (e.g., diabetes mellitus) can result in death. Severe protein malnutrition (rarely seen in developed countries) results in kwashiorkor, a disorder in which a child's stomach, face, and legs swell with water even though their arms are as thin as sticks and their skeletal growth has ceased. More common results of

malnutrition are vitamin and mineral deficiencies (e.g., beriberi, pellagra, anemia), cognitive deficiencies (e.g., memory difficulty, slowness of thought, depression), weak bones, and digestive problems (e.g., constipation, heartburn). Malnutrition during adolescence and adulthood can result in the cessation of menstrual cycles (i.e., amenorrhea), and malnutrition during pregnancy can result in miscarriage, low birth weight, or premature birth.

Anorexia nervosa is an eating disorder that is characterized by excessive dieting, distorted body image, an intense fear of gaining weight, and, in women and girls, amenorrhea. Although it is classified as a psychiatric disorder, anorexia nervosa is a form of self-starvation, which results in malnutrition and other physical signs and symptoms, such as brittle bones, bone marrow failure, reduced thyroid function, dry and yellowed skin, slowed breathing and cardiac rhythm, intolerance of cold temperatures, swollen joints, reduced muscle mass, brittle hair and nails, anemia, feeling faint, dehydration, and kidney abnormalities. As many as 5% to 10% of anorexics die from either starvation or suicide. The disorder can occur in either sex, but it is more common in girls and women.

Excessive weight gain can also have serious consequences for individuals. Excessive weight, especially in the form of adipose tissue that collects around the waist, is a risk factor for a number of chronic illnesses, including diabetes, hypertension, heart disease, arthritis, gallbladder disease, and some forms of cancer. Extra weight means extra stress on the joints and cardiovascular system, which can result in decreased stamina and flexibility and make it difficult to maintain physical fitness. Furthermore, heavy people who live in societies that value thinness (and believe that only thin people can be attractive) are often subject to discrimination (e.g., in hiring, promotion, college admissions) and social prejudice (e.g., teasing, bullying).

Lifestyle changes during the decades of the 20th century in industrialized societies have made it increasingly likely that people will gain excess weight. As economies have shifted from agricultural and heavy manufacturing to light manufacturing and service industries, people have used less energy to perform their jobs. The ubiquity of automobiles has resulted in less time spent walking or bicycling, and entertainment and leisure activities have also changed in a more sedentary direction. People are now more likely to watch sports than to participate in them, and television, computers, and electronic games have become the favorite pastimes of many children and adolescents. In addition, high-calorie foods (e.g., those high in fat and sugar) are increasingly available and heavily advertised. Sociocultural pressures to eat more and exercise less can lead to dysregulation of the set-point system because the body can only do so much to compensate for the energy imbalance that people create. Furthermore, fad diets and diet products can also dysregulate the set-point system. If people suddenly and significantly restrict their caloric consumption, the brain reacts the same way it does when a natural famine occurs. The metabolic rate will slow as much as possible, which makes it much harder to lose weight while on the diet and much easier to gain it back once the diet is over.

HOW MUCH WEIGHT IS TOO MUCH? HOW LITTLE IS TOO LITTLE?

Individuals' "ideal" weight may be determined genetically, the set-point described previously. However, the set-point is theoretical and cannot be measured. Physicians who worked for the Metropolitan Life Insurance Company reviewed thousands of files of their customers in an attempt to determine the average weights of the healthiest and unhealthiest. Their research led to the construction of tables of ideal weight ranges based on small, medium, and large body frames, and these tables were used as guidelines for many years. Unfortunately, the data in the tables came primarily from white, midlife, middle-class men, the people who were most likely to buy life insurance. There is no way to be sure that the weight ranges are actually ideal for any given person, and the determination of body frame size is, in many cases, arbitrary.

The calculation of body mass index (BMI) avoids the frame size controversy by dividing weight (in kilograms) by the square of height (in meters). However, the cutoff points that divide healthy from unhealthy BMIs remain arbitrary, may not be culturally appropriate, and do not allow us to distinguish between the weight of constituent parts of the body. Percentage and location of body fat seem to be more important to health than is body weight. Methods of calculating the percentage of body fat (bioelectrical impedance analysis, hydrostatic weighing, caliper tests) have been developed; however, their accuracy is debatable, and the amount of fat that is considered ideal remains an arbitrary cultural construction. Perhaps the only

way ever to know how much weight is too much and how little is too little is when symptoms of malnutrition or chronic illness appear. No one wants to test that hypothesis; thus, the best advice we can follow is to take steps to prevent weight-related illnesses.

FOCUS ON HEALTH, NOT WEIGHT

Once people lose or gain a great deal of body weight, the set-point makes it difficult to return to a healthy weight range. Therefore, people should eat a variety of healthy foods and avoid eating large amounts of high-calorie snacks and desserts. Foods high in fat and sugar content should be considered "treats" and eaten occasionally, as opposed to daily. The amount of dietary fat people need varies with developmental stage; infants and young children need greater amounts than midlife and older people do, and consumption should change with age. Don't forget the other side of the energy equation: Most people in industrialized societies should increase their activity levels. At every developmental stage, people need to get regular exercise by engaging in sports or walking or jogging regularly. Work activities (e.g., vacuuming) and hobbies (e.g., gardening) help us to maintain physical fitness and keep our energy intake and expenditure in balance, as do small lifestyle changes, such as parking farther away from our destination and taking stairs instead of elevators.

People have much less control over their body weight and shape than most Americans believe, but there are steps we can take to increase our chances of being healthy and physically fit. A focus on health rather than weight is very important. Our body is our friend, not our enemy, and we should treat it with respect rather than with loathing. Respect includes proper feeding and exercising, so that we work with our body, not against it.

—Joan C. Chrisler

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WELL-BABY CHECKUP

Physicians typically use well-baby checkups to monitor a child's growth and development, conduct necessary medical tests and interventions, and provide parents with anticipatory guidance. Thus, well-baby checkups are an invaluable means of promoting the health and development of infants and young children, although the events of each appointment may vary according to the child's age and issues unique to the child or family. Typically, physicians check a child's growth by measuring head circumference, height, and weight and then calculating a body mass index (BMI). Thus, health care providers are able to track a child's growth over time and ensure that growth is following a healthy trajectory.

Physicians also use regular baby checkups to observe and ask parents questions about their child's development. All aspects of development can be evaluated, including gross motor, fine motor, speech, and social-emotional development, as well as hearing and sight. For newborns, physicians likely would inquire about an infant's ability to move all four extremities, sucking reflex and visual tracking, and response to the parent's face and voice. For older infants, physicians' questions likely would include whether the infant is able to sit and crawl, whether the baby is grasping and mouthing objects, and whether the baby is babbling, smiling, and laughing.

Conducting recommended medical tests and interventions allows the physician to check for signs of illness. Each infant's temperature, heart rate, and respiratory rate are measured, and a thorough physical examination is conducted, including the infant's skin, eyes, ears, mouth, abdomen, and joints. A hearing screening is often conducted at some point. Tests are run for metabolic and blood disorders. If risk factors are present, children may also be tested for lead exposure. In the well-child appointment, mandatory immunizations are conducted according to a schedule set by the Centers for Disease Control and Prevention. Mandatory immunizations for infants include hepatitis B, diphtheria, tetanus, and pertussis (DTaP); *Haemophilus influenzae* type B (HiB); measles, mumps, and rubella (MMR); varicella; pneumococcal vaccine (PCV); and inactivated polio virus (IPV). If certain risk factors are present, physicians may recommend additional vaccines.

Well-baby checkups also provide parents with anticipatory guidance regarding issues such as injury

and illness prevention, developmental expectations, and family and community issues. For newborns, anticipatory guidance topics may include putting infants to sleep on their backs to prevent sudden infant death syndrome, securing infants properly into car seats, and feeding infants. For older infants, physicians are likely to address issues such as home safety, setting rules and limits, and how to handle sibling interactions, as applicable. Discussion of these and other topics provides parents with important information and opens the door for parents to ask further questions about their child's health, development, and behavior. Physicians may also consider referring a family to community resources, if needed.

Well-baby checkups promote the prevention, early detection, and treatment of medical and developmental problems and help ensure a child's healthy growth. Checkups also allow parents the opportunity to ask questions about their child's health and development. Children should receive well-baby checkups at the times designated by the National Center for Education in Maternal and Child Health: at birth, within the first week of life, and at 1 month, 2 months, 4 months, 6 months, and 9 months of age. For young children, checkups should occur at 1 year, 15 months, 18 months, 2 years, 3 years, and 4 years of age.

SUMMARY

Regular well-baby checkups serve several important functions, including monitoring children's growth and development, conducting necessary medical tests and interventions, and providing parents with anticipatory guidance.

—Christy Kleinsorge and Michael C. Roberts

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WHOLE LANGUAGE

Whole language, now largely discredited, was a popular educational philosophy and style of reading instruction that emerged in the late 1970s and flourished until the mid-1990s. Influential whole language theorists likened reading development to the natural and effortless emergence of oral language in young children, and a process that students would spontaneously acquire if they were immersed in a nurturing, literature-rich environment. Advocates such as Marie Clay, Kenneth Goodman, and Reggie Routman helped transform the teaching of reading by rhapsodically describing whole language classrooms as student centered (not teacher centered), meaning centered (not skill centered), and focused on literature (not on discreet letters and sounds or on phonics-based basal readers).

During the era of its popularity, whole language teachers rejected traditional instruction that used phonics, spelling lessons, and reading skill workbooks. Teachers came to embrace the idea that literacy concepts were to be discovered, not taught, and that learning to read should be natural, playful, easy, and meaningful. Professors in teachers' colleges, classroom teachers, and publishers quickly jumped on the whole language bandwagon.

CLASSROOM PRACTICES

A variety of teaching practices were associated with the whole language movement. Whole language teachers were encouraged to read literature aloud to students, give "picture walks" (talk about story illustrations) before guided reading, affix labels to objects in the classroom, and read big books while sweeping their hands under the lines of text. Beginning readers were encouraged to memorize short stories, rhymes, and predictable books. Daily activities focused on literature appreciation, enjoyable projects, discussions, and writing activities.

Whole language classrooms were typically organized into learning centers or cooperative pods, rather than in rows facing the teacher. Words were often posted on "word walls" around the room. Many

schools mandated schoolwide DEAR (drop everything and read) or SSR (sustained silent reading) time to provide for independent student reading. Because whole language advocates railed against standardized testing and instead promoted the use of "authentic assessments," teachers were urged to evaluate students based on portfolio evidence, conferences, and student reflections.

FALLING OUT OF FAVOR

Although much was written about the ecstasy of the whole language classroom (and some reports did show increased student motivation with certain practices), several comprehensive meta-analytic reports of empirical reading research have compellingly debunked whole language ideology, pointing instead to the crucial importance of systematic, explicit instruction in phonemic awareness and phonics for beginning readers. Research shows that most students learn to read when they are carefully taught to read and not merely exposed to good literature and fun literacy experiences.

WHOLE LANGUAGE LEAVES A LEGACY

Although many analysts blame whole language practices for years of plummeting reading achievement scores, the movement can actually be credited with bringing several benefits to the field. Whole language brought a renewed understanding of the importance of good literature in schools, a fresh emphasis on the importance of daily writing practice, the necessity for allowing "invented spelling" or "temporary spelling" while beginning writers practice sound and symbol generalizations, the idea that spelling is developmental, the essential importance of the teacher–learner relationship, and the necessity of reading instruction being exciting and pleasurable for students.

Although the U.S. government has now strongly endorsed phonemic awareness and phonics as essential components of beginning reading instruction, whole language practices persist in many classrooms. Certainly some teachers who identify themselves as whole language teachers artfully combine literature-based learning with more recently mandated research-based phonics instruction. But phonics experts (sometimes teasingly called *phonicators)* and whole language enthusiasts (sometimes termed *holy languagers* or *holey languagers*) continue their pedagogical debates in the persistent so-called reading wars. The whole language movement inspired controversy that lingers today.

—Lynn Melby Gordon

See also Language Development

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WIDOWHOOD AND WIDOWERHOOD

The loss of a spouse is typically characterized as one of life's most stressful events, and older adults often state that the loss of a spouse is the defining event of their later years. A wide range of reactions is possible when a person enters into widowhood or widowerhood. Although research has suggested that widowed individuals experience a variety of challenges, it is important to remember that each person's reaction is highly influenced by his or her specific situation. Factors such as length of marriage, age of widow or widower, social and family support, financial resources, type of loss, and many other features make each situation unique.

According to the 2003 U.S. Census, about 2.5% of men (widowers) and 9.7% of women (widows) older than 15 years were classified as widowed. This translates into almost 14 million Americans who have lost a spouse and have not remarried. Research on widowhood and widowerhood has typically focused on the challenges faced by older widows. This is likely because about 62% of all widowed individuals are women older than 65. Conversely, there has been comparatively little research done on widowers, younger widows, and individuals who have lost a same-sex partner.

Both widows and widowers face significant challenges as they adjust to the loss of their partner. Studies have shown that widowed individuals face notably higher rates of health problems. Older widows and widowers also experience higher rates of disability and mortality than married controls. Not surprisingly, both widows and widowers have significantly higher rates of depression than their married counterparts. Often these elevated rates of depression can continue for many years.

It is difficult to determine whether men or women are affected more negatively by the loss of their spouse. Widowers tend to seek out and receive less social support. They are also less inclined to openly express their emotions regarding their loss. Conversely, widows tend to seek out social support and tend to openly convey their grief. Many researchers have argued that marriage tends to be more beneficial for men, and so the loss of their spouse has a greater negative impact. Additionally, many men expect to precede their spouse in death and therefore are surprised when the opposite occurs. Some men have difficulty dealing with the daily aspects of living alone, including eating healthy meals and maintaining a clean living environment. On the other hand, widows often have difficulty sustaining the same standard of living and managing their financial affairs.

An area of specific concern for widowers, especially older widowers, is the markedly increased rates of suicide. Older widowers have a suicide rate about 12 times as high as the rate for older widows. Widowers also demonstrate an increased rate of alcohol abuse compared with other men of the same age.

Some widowed individuals, especially younger widows and widowers, remarry at some point in their life. Research has shown that men are more likely than women to remarry, and younger widows are more likely than older widows to remarry. A significant factor in remarriage is the availability of suitable partners, which explains the relatively low rate of remarriage by older widows. However, it is interesting to note that older widowers do not have a higher rate of remarriage than younger widowers. This suggests that some widowed individuals, especially older individuals, simply choose not to remarry.

—Jason M. Troyer

See also Death

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WISDOM

What comes to mind when thinking of wise people? Individuals might think of religious leaders, gurus, priests, medicine men, shamans, and sometimes politicians or therapists. These don't necessarily need to be famous people. On a personal level, someone might think of one's grandfather or grandmother and remember a situation in which their advice shed new light in a situation and was therefore eye opening.

What all these people have in common is a certain age. Rarely is wisdom attributed to a young woman or man. It is attributed to people in *late adulthood* who have had many experiences in life. This is the case in most cultures around the world. On the one hand, wisdom can be a goal of development, that is, something people strive for; on the other hand, wisdom can be the prerequisite for successful coping with life tasks during a certain life period. In any case, wisdom is something positive and admirable.

To get a better grasp of the concept, wisdom has often been discussed in the context of *intelligence*. Cattell distinguished between fluid and crystallized intelligence. Fluid intelligence is related to deductive reasoning, abstract thinking, heuristics for coping with new situations, and the speed of processing information. Fluid intelligence has its peak in young adulthood and declines with age. Crystallized intelligence refers to the whole body of experiences, skills, algorithms, and factual knowledge. Crystallized intelligence almost always increases with age. The increase in crystallized intelligence can make up for the loss in fluid intelligence. Crystallized intelligence can be seen as the basis of wisdom. However, there are some differences between crystallized intelligence and wisdom. First, crystallized intelligence is assessed in intelligence tests on information, vocabulary, facts, and school learning. Wisdom can hardly be measured because it is related to concrete knowledge about life experiences, including life's uncertainties and paradoxes. Second, contrary to intelligence, wisdom is less related to the current sociopolitical conditions. Wisdom encompasses a broader timeframe, learning from history, knowing the past to inform the future and to reflect on the present. Third, wisdom is more then just a body of theoretical knowledge. It has cognitive, motivational, affective, and interpersonal qualities.

For example, professors are often seen as very knowledgeable and bright, but not always necessarily as wise. The *cognitive* component of wisdom refers to experiential and practical knowledge of life. Wise advice is given with a profound understanding of the person and the situation. Wisdom is often connected with thinking outside the box and interpreting the situation from a different angle. It can be seen as the ability to deal successfully with the uncertainties, complexities, and problems of life. As the philosopher Karl Popper stated, "Living is problem solving. Problems and life entered the world together and with them problem solving." Wisdom often refers to creative strategies of problem solving. Strategies are abstract prescriptions on how to interpret and solve life problems, for example, being patient and sacrificing the immediate for the long-term good.

A wise person is not *motivated* by power, glory, or fame. Wise advice is given without considering one's own personal interest and benefits. The person in need or the society in need benefits from the wise advice. The motivation is to care and to be responsible for others. This is the interpersonal component of wisdom. *Emotionally*, a wise person is often described as courageous, fearless, and calm, with a healthy distance from the situation.

The description of the different components of wisdom sheds new light on the question of whether wisdom has a strong *genetic* component or can be *learned*. Often, the genetic side of wisdom has been emphasized. However, wisdom could be partly acquired by being available for reflection and reflexivity in one's life experiences, learning values of responsibility for oneself and the community, learning that giving is sometimes more than receiving, deciding and acting on choices that benefit more people in the long term rather than focusing on the immediate and sole gratification of a few people, and understanding the essentials of life, including the paradoxes and realities, in more detail.

Wisdom of individuals can become part of the wisdom of a collective, for example, a cultural group's *sayings* or *proverbs*. Von Senger, for example, analyzed such proverbs in the Chinese language. Especially relevant today, yet conceived more than 2,300 years ago, Sun Tsu analyzed the art of war in China, according to successful and unsuccessful strategies, for example, "Know your enemy, know yourself, and your victory will not be threatened. Know the terrain, know the weather, and your victory will be complete." Or "No country has ever benefited from a protracted war." Or "The supreme art of war is to subdue the enemy without fighting." However, such sayings or proverbs do not always give clear prescriptions for acting because they are often contradictory, for example, "Don't put off until tomorrow what you can do today" but "Sleep on it," meaning either act right away or wait before you act. Wisdom refers to the ability to consider the demands of the situation. In some situations, it might be appropriate to wait. Time might lead to a clearer mental representation of the problem situation and thus be helpful for coming up with a solution. In other situations, it might be appropriate to act right away. The situation might change, the chance of the moment might be lost, or waiting might aggravate the problem. A wise person, then, is one who considers the value of timing and context of the situation, and adheres to the greater good of people.

To summarize, wisdom refers to the understanding of people in concrete life situations. Wisdom is based on a huge body of life experience and knowledge of

problem-solving strategies and on an emotional distance and fearlessness when giving advice without having one's own intentions in mind.

—*C. Dominik Güss*

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WORK

Work is commonly defined as an activity that involves effort and sometimes reward. The result of work could be the achievement of a goal, the meeting of a demand, the completion of a task, or the generation of income. This variety of results of work reflects the different meanings that have been and continue to be attached to the activity of work. These differing results of work are associated with a range of psychological and development factors. Work can be considered from a historical perspective but also in terms of its developmental and psychological consequences. The sorts of activities that many in the Western world call work are very different from those pursued by our ancestors. However, some of our current approaches and attitudes toward work may be more than 2 million years old.

Evidence of work as a fundamental activity of human development is often inferred from discoveries of fossilized tools. Using this approach, work has been documented occurring at least 2 million years ago in the Olduvai Gorge in Tanzania. The extinct species of the genus *Homo habilis* apparently used stone chopping tools to butcher dead animals. About 700,000 years ago, hand axes were in use, and thereafter, there is evidence of specialized industries being established based on crafting stone or flint into a variety of different tools.

Debate continues about the degree of organization that existed in production of these crude tools and about the degree of organization in the trade and deployment of such tools. The traditional view is that work was no more than an attempt to meet direct survival demands. Indeed, many accounts of early humans portray them as working as scavengers and behaving like savages. However, there are intriguing examples from relatively modern times that may point to a more sophisticated role of work in the earliest human groups. Aboriginal tribes in the Northern Territory of Australia did not develop tools beyond stone axes at the time of their first contact with white settlers in the 19th century. However, they had developed advanced trade and distribution networks for their tools.

It appears that even primitive forms of work were focused on more than just survival demands. Trade and distribution of tools require planning, logistics, and demarcation of roles. Passing on skills to the next generation requires training and development. Furthermore, it appears that survival demands were not as unrelenting and fraught as some have supposed. Studies of modern hunter-gatherer societies reveal that they often have time for activities other than those associated with the immediate survival of the group, such as hunting, gathering, and fighting rival groups. These other activities included social interactions within and beyond the group, ceremonies, rituals, and religious and aesthetic pursuits. All these activities tended to blend into a kind of "group or tribal life" and were not divided up as in modern developed societies. For example, such tribe people painted the animals they hunted, married and procreated for the survival of the group, and engaged in religious activities often to enlist the favor of the Spirit or Spirits for ongoing personal health and community well-being.

WORK AND SLAVERY

As agrarian societies developed, work and all other aspects of farming life were determined by the seasons. Life and work were cyclical—sow, tend,

harvest, store. Amid the vicissitudes of climate (good and bad seasons, floods and droughts), there was a rhythm to existence. Agrarian societies initiated the establishment of private ownership of land. Agriculture also was more specialized and required markets for commodities. With a scarcity of labor and advances in technology, slavery was supplied through either conquest or purchase, and a life of work developed in various parts of the world.

Slavery underpinned some of the greatest civilizations in history. Although slaves predominantly engaged in manual labor, particularly agricultural work, some slaves worked as tradespeople, teachers, domestics, and doctors. Slavery is one of the most powerful examples of the stratification of society through the division of labor. Slaves were often seen by the ruling class as an unruly rabble that was temperamentally work-shy and untrustworthy. This "rabble mentality" was echoed in management theories of the early 20th century and is still evident in some current confrontational management practices. The dependency on slave labor has been associated with the decline of the Roman Empire because of the loss of a work ethic among the citizens.

Slavery reminds us of the central role of freedom and discretion in work. Slaves did not have freedom of expression, congregation, worship, representation, decision making, fear, or want. The distinction between slavery and freedom is not as clear-cut as it might seem. An interesting question is whether the slave of Roman times would identify with a modern executive living in a company-paid house, driving a company car, working 85 hours a week, espousing the company values and vision statement, and being at the beck and call of his or her employer by mobile telephone and email.

WORK AND RELIGION

In less developed societies, religion served to foster the success of survival activities such as cultivation, gathering, hunting, and harvesting. However, in European civilization for about 1,000 years, the organizational prowess of the Christian Church resulted in large landholdings and massive building projects, which in turn afforded a range of work opportunities. These created significant wealth for the Church and with it material and mercantile temptations.

Protestantism provided a potent doctrine that combined religious devotion with the extolling of hard work. The Protestant Work Ethic emphasized thrift, industry, wealth, and discipline as fundamental virtues. Whereas in the past, Roman Catholic orthodoxy had interpreted the Bible as presenting work was a curse, Protestants reinterpreted work as a blessing. For example, in the book of Genesis in the Old Testament, God is presented as a worker who creates the world in 6 days and ceases from his labors to rest on the 7th day. Moreover, Adam in his unfallen state is commanded to work, tending and ruling creation as God's steward. It is a naïve misreading of the text (still prevalent in textbooks today) to interpret work as a curse after the Fall. Work was originally viewed as good and as part of what humans were made for; however, like every good thing, after the introduction of sin, its blessing became its curse. That is, work in Biblical terms is not a curse in itself; instead, work has become cursed in that we encounter frustration, toil, and obstruction. Protestantism, especially Puritanism and Quakerism, was exported to and flourished in America. The emphasis on hard work and community led to an unprecedented organization of labor into jobs and work shifts. In addition to manufacturing endeavors such as Cadburys in England and Hershey in America, Quakers opened banks and established lines of credit outside of the normal confines of the city.

SPECIALIZATION OF WORK

As settled societies developed towns and new technologies, further specialization of work functions occurred. In particular, a stratum of society sat between the slaves, peasants, laborers, and serfs and the ruling classes of soldiers, lords, knights, and kings. These were the craftsmen who organized themselves along functional lines into part trade unions and part trade associations. In medieval Britain, they were called guilds, but similar organizations developed around the world. Hierarchies existed within these *guilds*, with long apprenticeships to reach the level of a journeyman. The highest level, Master, was achieved after many years of work and the production of a "masterpiece" accepted by the guild.

Guilds provided a powerful mechanism for the control of skilled labor. Guilds in some towns had significant political power as a result of their control of skilled labor. As guilds became more sophisticated, the emphasis moved toward trading the skills and away from the development of the skills. Masters of

guilds restricted the number entering and progressing through the guilds to maintain control over the supply of skilled labor. As a result of this, many workers were employed as "wagemen," as opposed to apprentices or journeymen. This created a new class of employer-employee relationship.

The industrialization of Western societies in the late 18th and early 19th centuries dramatically severed the necessary nexus of work and the natural world. Increasingly, work became linked to technology, usually centralized in factories and mills, necessitating massive and unparalleled urbanization around the new sources of employment. Economic power determined the nature and conditions of the work available and, as a consequence, the life circumstances of millions of employees. As a result, employees eventually organized into unions to bargain over the pay and conditions of work. In the process, the field of industrial relations emerged and has remained one of the central characteristics of contemporary working life in developed economies. The change from an agrarian to an industrial era was difficult for many workers. Many resented the loss of autonomy of having a farm of their own, being forced to move to the city often to live in squalor, being underpaid and forced to work in dangerous conditions, having no control over the work process, and being consigned to repetitive and seemingly useless sets of duties. Work became associated with mass production and mass production with worker alienation, which sometimes found expression in industrial sabotage. As industrialism developed, work became increasingly fragmented, simplified, and repetitive.

WORK AND TECHNOLOGY

Technology has profoundly influenced work practices throughout history. Two inventions in the past century that have generated dramatic change are the internal combustion engine and the microcomputer. The internal combustion engine greatly enhanced the mechanization of work. For the first time, workers were not necessarily undertaking the primary work tasks, but were instead tending, operating, or maintaining machines that did. This created an explosion in productivity as production was no longer directly related to worker effort or skill. The Ford Motor Company is often credited with the introduction of the production line method of working; however, Ford management had observed a Chicago meat-packing business where carcasses were hung from moving hooks and were butchered as they moved along. Until 1909, cars were assembled in teams, with all the workers being involved in the process of construction from start to finish. When production lines were introduced, productivity jumped, and the cost of a Model T Ford halved in 3 years. Workers were reduced to doing one or two activities on a product as it moved along a conveyor belt. These same activities were repeated thousands of time per day, and yet at the end of the day, there was still an apparently endless stream of further products to be processed the same way. People often reported being treated either as part of one of the machines or like a monkey. Such work robbed the workers in many cases of a sense of achievement, a sense of ownership, a sense of skill and personal development, and a sense of meaning through work.

As the quality of working life declined in industrial societies, the value of nonwork time increased. The demarcation of work to a specific location and a number of hours per week delimited work and how it was understood by many in industrialized societies. The problem that increased production created for Ford was that supply outstripped demand because the working hours at the time were so long, individuals did not have time to devote to other activities for which a motor vehicle might be required. Henry Ford's solution was to cut the hours of work so that workers would be able to use the cars that he was producing. The widespread availability of motor vehicles to large portions of society further fueled the pace of change. Workers were able to live further from their place of work, creating suburbs and commuters. Furthermore, there was a large increase in tourism because ordinary people were now able to access distant parts of the country rapidly. This stimulated a nascent tourism and service industry that was already benefiting from enhanced rail infrastructure. The relationship between work and nonwork and leisure has become a major field of theory and research.

Communications technology also had a dramatic effect on work in the late 19th and 20th centuries. The telegraph and then the telephone made the world a smaller place and enabled information to be exchanged at a hitherto unheard-of pace. By the mid-20th century, the computer was developed, and it began to be used by governments and large organizations in the 1950s and 1960s. However, the development of the microprocessor chip led to the first personal computers

being widely available for business and home use. The IBM Personal Computer was launched with Microsoft software in 1981. The Apple Corporation had already released the Apple II computer. The impact of the introduction of the personal computer was almost instant. These machines were capable of doing many of the routine clerical tasks in offices faster and more accurately than human clerks. In the same way that machinery had led rapidly to redundancies in manufacturing jobs, computers cut a swathe through clerical jobs. Computers were also employed to control machines, creating robots for a range of tasks, including motor vehicle manufacture.

The combination of communication technology and computer technology has led to further rapid changes in how we work. Telecommuting is now a fact of life for many workers. Employees do not need to be physically present in the workplace; indeed, the notion of the workplace is changing. The mobile phone, laptop computer, and Internet have brought the workplace back into the home for the first time in hundreds of years for some sections of the workforce. This has further complicated the separation of work and nonwork.

With rapid growth in the use of technology, efficiency of production and process has very often come at the expense of employment opportunities and at the cost of nonwork time.

Technological advancement has significantly lengthened the hours of work for some well-educated people in the workforce while at the same time presented long-term unemployment for less-skilled workers. Furthermore, the employer-employee relationship is no longer as intimate as it once was because of globalization. Employees can no longer rely on the quality of their work or their personal qualities to ensure continuing employment but rather are subject to the fluctuations of the international money markets. The complexity and rapidly changing nature of work have spawned at least two specializations within the field of psychology—industrial and organizational psychology and vocational psychology. Central to these endeavors has been the notion of work adjustment and well-being of the worker and organization.

Improvements in manufacturing efficiency continued apace throughout the 20th century, which also saw the development of jet propulsion and affordable air travel and transport as well as large and reliable motorized shipping. This has greatly increased world trade opportunities and development of global organizations.

FORMAL AND INFORMAL WORK

About one third of our time available for living is taken up with work and 20% with leisure. Despite the central role work plays in most of our lives, its purpose, meaning, and psychological influence remain vexed questions. For instance, there is a plethora of research from social and organizational psychology that suggests that work is injurious. A recent study found that most people replied that they "wished they were doing something else" when asked while they were at work. In another study, 19% of women and 14% of men reported having unpleasant emotional strain for more than half of the previous working day. This suggests that many people do not enjoy the experience of work and may experience significant deleterious effects from work. However, other studies point to the benefits of work and our reluctance to forego work. A survey of more than 500 lottery winners concluded that people with psychologically and financially rewarding jobs continued working regardless of the amount they won, whereas those who worked in low-paying semi-skilled and unskilled jobs were far more likely to quit the labor force. In another study, 80% of Americans said they would not retire from working even if they had enough money to live off comfortably. Hence, we end up with the paradox that work is a source of frustration, yet one we are reluctant to forego. However, what constitutes work and leisure is increasingly difficult to define. For instance, whereas working as a mechanic would be seen as work to most people, is working at home tuning your car's engine work or leisure? The difference perhaps is between formal and informal work.

Formal work tends to be associated with income and most commonly with monetary reward defined by some legal arrangement such as employee-employer, self-employed, business partners, subcontractor, agent, or representative. Generally in such arrangements there is a financial exchange between the worker and some other party, such as an employer or a customer or client. These forms of work have been studied extensively from many different perspectives, including industrial relations, sociology, psychology, philosophy, economics, and business studies.

Informal work constitutes activities that fall outside the definition of formal work but still possesses

at least one of the characteristics set out in the definition of work. Domestic chores around the house and garden would fall into this informal category, along with charity and voluntary work. In many societies, this work has been traditionally performed by women.

WORK AND DEMOGRAPHY

In 1997, married women in Australia spent an average of 1 hour, 47 minutes per day more on domestic work than men. Women spent an average of 3 hours, 46 minutes on household work, compared with 2 hours, 30 minutes for men. There was evidence of clear demarcation in the type of household work done by men and women. Women did more food preparation and clean-up than men, 30 minutes more laundry work, and 30 minutes more general housework. Men did 25 minutes more grounds and animal care and 25 minutes more home maintenance. Large discrepancies between the amount of informal work done by men and women have been linked to divorce rates. The requirement to do domestic informal work is common for most people, with the exception of the very wealthy who have continued to employ domestic staff, thereby formalizing this type of work.

In 1870, 52% of employed women were engaged in paid domestic work. At the end of the 19th century, the figure was 1.5 million. By 1920, 28% of employed women were paid domestic workers; the proportion decreased further to 18% in 1940, which was the last time the job was at the top of the list of women's occupations. By 1970, the percentage had declined to 5.1%, and then to 2.5% in 1980. The decline in domestic jobs for women was in part due to the widespread availability of clerical roles. At the same time, some of this work was outsourced to restaurants and child care centers.

In American Colonial homes that produced goods, neighborhood girls helped the housewife with cooking, clothes making, baking bread, and producing dairy products in return for room and board and an apprenticeship in these skills. This position changed from a "helper" to a formalized "live-in servant" who was expected to do the household chores employing all of the new facilities, such as gas and electricity, and their attendant appliances. Typically, these were rural workers attracted to the higher wages available in the city.

Domestic work remained a low-status job and became identified with women of color as white women moved into clerical occupations. Between 1920 and 1940, the proportion of African American women in domestic work rose from 46% to 60%. The most common form of domestic work by the 1980s was day cleaning, performed by a range of people of color. Teenage babysitters constituted the largest group of white Americans who were listed as domestic service workers.

Domestic work, whether formal or informal, was excluded from most legal protections and social security entitlements, and even denied protection in the form of a union until the 1970s, when the industry was in sharp decline. However, both formal and informal domestic work is becoming increasingly recognized as a valid form of work that may be associated with psychological outcomes. With women's dramatically increased participation in the workforce in the late 20th century, there has been a resurgence in the formalization of domestic work to assist busy dual income couples. There has been an increase in employment of cleaners, child care assistants, cooks, and butlers. This has been extended to dog walkers and "Saturday Dads" who take children to weekend sporting events. These changes in working patterns have caused a blurring between work and leisure. For instance, time spent with and caring for children is classified by some as work, whereas others classify this as leisure.

WORK AND UNEMPLOYMENT

One way to look at the importance and role of work in human life and development is to examine what happens when people are deprived of the opportunity to work. In her classic research investigations into the effects of unemployment, Marie Jahoda delineated most of the major psychosocial benefits of work in addition to pay and conditions. She found that work performs five psychosocial functions for the individual and that those without work face the challenge of meeting these needs in some other way. First, work enables and often demands social contact. Such contact fosters the development of social skills, the establishing of social networks, and opportunities for mutual support. Second, work demands activity and almost always demands at least a minimal level of physical activity. There are many studies illustrating the physical and psychological benefits of regular activity in sustaining fitness, energy levels, mental alertness, and work conditioning. Third, work in most societies gives people a

social role and social identity. Knowing someone's occupation, especially when meeting him or her for the first time, usually gives us a great of information about him or her—education, intelligence, personality, success, income, social status, and how much he or she is or is not like us. Work is a major way in which people define themselves and others within the community. Fourth, work gives structure to people's time. Work usually demands that activities be undertaken at specific hours of employment. This benefit provides a pattern to people's lives, allowing them to make arrangements about nonwork tasks. Fifth, work links people with goals larger than themselves and their own immediate concerns. By having to direct attention away from self to another task external to our individual focus, work usually is an opportunity for external orientation to others and the work in general.

Other researchers have considered the less positive effects of work. In particular, the concept of occupational stress has been extensively researched and is probably the most commonly researched area of work now. Although definitions of stress appear in 16th-century dictionaries, it is generally agreed the term became popular after the Second World War. The term *stress* has passed into the modern idiom despite significant confusion over its meaning. Stress is classically defined as a nonspecific response of the body to any demand made on it. In this scheme, there are three stages of the stress reaction: alarm, resistance, and exhaustion. Other definitions focus on a range of negative affective and physiological responses. Some researchers, most notably Robert Karasek and Roy Payne, have considered the relationship between the characteristics of a person's job and his or her stress response. Both researchers have argued that perceived job demands and perceived control over meeting those demands will predict stress. Jobs that are high in demands and low in control are predicted to be the most stressful. The relationship among job demands, control, and stress has been well documented in the literature for more than 20 years. In addition, other factors, such as the degree of social support enjoyed in the workplace, have been shown to predict stress levels.

Work has been a central activity of all human societies and has provided significant material, societal, and psychological benefits. However, at the same time, it is clear that work in and of itself can be not only unsatisfying but also positively deleterious for psychological and physical well-being. Perhaps John Paul Getty, the industrialist, best summed up the nature of jobs when he said, "if you haven't got a problem, you haven't got a job." Work is about solving problems, and employment is about delegating this task to others.

SOME CONCLUDING COMMENTS

Work is now recognized as broader than merely having a job. Much essential work is carried on outside of the labor market. There is increasing recognition of the value of such activity for communities and nations as a whole. Moreover, as noted several times, the distinction between work and nonwork is often difficult to delineate—so much so that modern formulations of "career" typically encompass not only worker as employee but also all the multiple roles that individuals take up, shed, and resume at various times in their ongoing development. Writers about the future of work expect that work will continue to change with new occupations developing while old ones perish; that there will be an increasing emphasis in work on academic, creative, and intellectual skills, in comparison with manual and mechanical skills; that work training will become a lifelong learning process and will be conducted increasingly through distance education and the Internet; and that work will be conducted in increasingly globalized and multicultural contexts.

The paradox of work remains with us. Most of us get a sense of contribution and well-being from work as well as an income to help us live. We are confronted by frustration, toil, and boredom while working. We expose ourselves to significant risk: physical injury, stress, bullying, harassment, mockery, and reputation harm through work. Yet work also provides opportunities to turn preoccupations into occupations for growth, enlightenment, contribution, service, and achievement.

—Jim E. H. Bright and Robert G. L. Pryor

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WORLD HEALTH ORGANIZATION

The World Health Organization (WHO) was established in 1948 as a specialized agency for the United Nations devoted to issues of health. It is governed by the 192 Member States of the United Nations, with headquarters in Geneva, Switzerland. A nation can be a member of WHO without being a member of the United Nations. There are six regional offices throughout the world:

Regional Office for Africa in Brazzaville, Republic of Congo

Regional Office for Europe in Copenhagen, Denmark

Regional Office for South East Asia in New Delhi, India

Regional Office for the Americas/Pan American Health Organization in Washington, DC

Regional Office for the Eastern Mediterranean in Cairo, Egypt

Regional Office for the Western Pacific in Manila, Philippines

The main functions of the WHO are as follows:

1. To give worldwide guidance in areas related to health
2. To set global standards for health
3. To cooperate with governments in strengthening national health programs
4. To develop and transfer appropriate technology, information, and standards

The services include a day-to-day information database on the incidence of internationally significant diseases; publishing a list of diseases, injuries, and deaths; monitoring adverse reactions to drugs; and establishing world standards for antibiotics and vaccines. There is a strong training component and resources to strengthen the delivery of health services.

Efforts to control and eradicate infectious diseases have been a main focus for the WHO. One of the major accomplishments of the WHO was the elimination of smallpox. Smallpox was endemic in 31 countries and claimed almost 2 million lives a year. In 1967, a systematic effort to vaccinate selected populations in endemic countries was initiated. By 1972, the disease was present in only 8 countries. The last case of smallpox was discovered in Somalia in 1977. Today, the WHO is focusing on the eradication of polio, neonatal tetanus, leprosy, and iron-deficiency disease.

In 1977, the World Health Assembly, which consists of the member nations, set the goal of "health for all by the year 2000." This slogan does not mean that there will be an end to all disease or disability, but rather that basic health care will be available to everyone. The focus is on health care in community settings, such as homes, schools, and the workplace.

In 1978, representatives from 134 countries met with WHO delegates in Almatay, Kazakhstan, and agreed to implement the "health for all" motto through primary health care. Primary health care emphasizes the responsibility of the community to use health strategies that are appropriate and affordable. Such services would include health education, adequate food supply, safe water, basic sanitation, maternal and child care, family planning, immunizations, prevention and control of local endemic diseases, appropriate treatment of common diseases and injuries, and provision of essential drugs.

Recognizing the threats to the public health posed by accidental or intentional release of harmful agents, the WHO in 2001 made specific recommendations regarding global health security. The WHO issued a resolution that every country should be able to detect, verify, and respond appropriately to epidemic-prone threats when they arise, resulting in the development of the Department of Communicable Disease Surveillance and Response (CSR). This unit aims to attain global health security through the containment of known risks, such as emerging infections; response to unexpected events, such as global outbreaks; and

improved preparedness by strengthening national capacity. The aspect of improved preparedness is addressed through an integrated approach providing expert assistance in epidemiology and enhancement of laboratory skills.

—Linda Spencer

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WRIGHT, JOHN C. (1933–2001)

John Cook Wright was born in Los Angeles and grew up in Washington, DC, and Tucson, Arizona. He graduated from Phillips Exeter Academy in 1950, received a bachelor's degree from Harvard University in 1954, and after a 2-year stint in the army, earned his doctoral degree in psychology from Stanford University in 1960. His dissertation was a study of noncontingent reinforcement, supervised by Alex Bavelis, and he also worked with Robert R. Sears on a classic study of child rearing and child development.

Wright spent his long career as a college professor, researcher, social activist, and advocate for the welfare of children. He taught at the University of Minnesota (1960–1968), the University of Kansas (1968–1996), and the University of Texas at Austin (1996–2001). With his wife, Dr. Aletha Huston, he founded and directed the Center for Research on the Influences of Television on Children (CRITC).

Employing innovative experimental methods, Wright applied developmental theories of perceptual attention to describe the mental processes of the young television viewer. His research showed that children are active during viewing; they work deliberately to decode, interpret, and understand the content presented. The formal features of television (production techniques such as cuts, fades, pacing, and animation) are critical tools that children use to judge what content is interesting, comprehensible, and meets their viewing goals. Wright developed his traveling-lens model as a framework to explain that children dedicate the most time and attention to television segments that are both comprehensible and stimulating. As children mature, content that was previously incomprehensible becomes more desirable and engaging.

With a team of colleagues, Wright performed the premier longitudinal studies measuring the effects of early educational television viewing. This line of research revealed that viewing *Sesame Street* at ages 2 and 3 years is related to higher language abilities and better school preparation at age 5. These positive effects do not dissipate after kindergarten—especially for boys, preschool educational viewing predicts higher grades in high school. Wright claimed that early viewing of educational television helps set boys on a positive educational trajectory that begins at school entry and translates into higher levels of success in high school. Informed by the results of these studies, he argued that television as a medium is neither good nor bad—the content viewed determines the effects on the viewer. Contrary to Marshall McLuhan's famous dictum, "The medium is the message," Wright staunchly proclaimed, "The message is the message."

—David S. Bickham

See also Television

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Y

Young Adulthood

Youth cannot know how age thinks and feels. But old men are guilty if they forget what it was to be young.

—J. K. Rowling

YOUNG ADULTHOOD

What does it mean to become an adult? Most people rate the top criteria for marking the entry to adulthood as accepting responsibility for one's self, making independent decisions apart from parents, establishing egalitarian relationships with parents, and achieving financial independence. Although self-sufficiency has been attained in young adulthood, the period of the twenties and early thirties, young adults continue to grow and change in multiple arenas: biological, cognitive, psychosocial, and social.

BIOLOGICAL CHANGES DURING YOUNG ADULTHOOD

Typically, full height is attained in middle to late adolescence. Yet growth is not complete; the size and shape of the body continue to change in young adulthood. Both accumulation of fat and growth of muscle continue such that women reach their full breast and hip size and men their full shoulder and arm size in their early twenties. Throughout the twenties, physical strength and athletic skill increase, peaking at about age 30 and declining thereafter. All the body systems (e.g., the digestive, respiratory, circulatory, immune, and reproductive) reach peak levels of functioning in early adulthood. When physical growth stops, senescence, or age-related gradual physical decline, begins.

Generally, the first noticeable age-related changes occur in the skin. The connective tissue of the body, collagen, begins to decrease at about age 20, by about 1% each year. The skin thins and loses elasticity, making wrinkles visible, especially around the eyes. These age-related changes in the skin occur all over the body but are most noticeable on the face. At about 30, reductions in the number of pigment-producing cells in the head lead to the emergence of gray hair. At this age, hereditary baldness in men becomes apparent; hair also begins to thin because of hormonal changes and reductions in the blood supply to the skin.

There is a great deal of variability in the process and timing of aging. Connections between age and physical change in adulthood are loose and not as predictable as developments during earlier periods in life. Change varies widely across parts of the body, with some parts affected more than others. For example, a given individual's liver may age more quickly than his or her lungs, particularly if he or she consumes heavy amounts of alcohol. In addition, there are tremendous individual differences in the aging process. Some

individuals age more quickly than others, because of genetic and lifestyle differences.

COGNITIVE CHANGES DURING YOUNG ADULTHOOD

Most of us recognize the changes in cognition that children and adolescents undergo, but cognition continues to develop in young adulthood.

Postformal Reasoning: From Dualism to Relativism

During young adulthood, many people progress beyond Jean Piaget's formal operational stage of reasoning to postformal reasoning, entailing a shift from dualistic thinking to relativistic thinking. Dualistic thinking entails a belief in absolutes regarding information, authority, and values. Individuals who think in dualistic terms believe that there are concrete right and wrong answers to every question. Adolescents, for example, tend to think in dualistic terms, always looking for the one "right" answer. With time, experience, and exposure to diversity, young adults transition to relativistic thinking in which they realize that there are many perspectives on any given topic. Instead of one absolute truth, relativistic thinkers consider multiple truths, relative to given contexts and perspectives.

The postformal reasoner understands that an individual's perspective is one of many views and that there are few absolute answers; knowledge is not fixed, but changes. Therefore, postformal thinking is flexible, permitting us to attend to both the problem and its context, which is needed to adapt our cognitive problem-solving skills to real-world situations. Postformal reasoning combines objectivity, or abstract logic, and subjectivity, or situation- and individual-based feelings and experiences. In young adulthood, we are confronted with problems in work, marriage, and family life that do not have single correct solutions. Yet how we handle these problems influences our future and life course. Mature thinking entails integrating logical and objective processing with sensitivity to context and personal perspective.

Dialectical Thought

At its best, the cognitive flexibility of formal operational reasoning reaches the level of dialectical thought, an advanced level of reasoning. Dialectical reasoners understand that every idea also suggests the opposite idea. Dialectical reasoners are capable of considering both poles simultaneously, integrating and synthesizing them, and adapting to the resulting continual changes. Dialectical thinking entails integrating and synthesizing our experiences and ideas with the contradictions and inconsistencies we encounter, resulting in a constantly changing perspective of oneself and the world. It is understood that few questions have single unchangeable answers; however, unlike relativistic reasoners, dialectical reasoners recognize that although there are many perspectives or viewpoints on a given situation, some hold more merit or can be better justified than others and permit a more solid foundation for decision making.

Although we first become capable of postformal operational thinking in young adulthood, and many young adults transition to relativistic thinking, only some young adults develop the capacity for dialectical reasoning. Many people do not become dialectical thinkers until middle adulthood, if at all.

Effect of College on Cognition

How does college influence thinking? With college education, people tend to become more tolerant of differing political, social, and religious views and more flexible in their attitudes and consideration of differing perspectives. Research suggests a progression by which the more exposure students have to college, the greater the level of cognitive development, from dualism, to relativism, and, in some individuals, dialecticism.

First-year college students, for example, tend to believe in absolute truth (dualistic thinking); they are often disappointed when professors answer their questions with lengthy generalities (i.e., "it depends on a variety of factors"). Then students enter a phase of extreme relativism in which they question the notion of a universal truth and become lost in a sea of perspectives, recognizing that there are multiple perspectives and each can hold merit, varying by context (relativistic thinking). Finally, students come to realize that although there are multiple perspectives, each can be weighed, and they differ in terms of overall merit. They become committed to particular values, can recognize multiple perspectives, and remain open-minded. True dialectical thought in which contradictions are synthesized into a complex and dynamic perspective occurs for some, but not most, college students.

The intellectual challenge, social interactions, and exposure to a variety of perspectives through class discussions, peers, books, and professors that is typical of a college education stimulate students to consider new questions and thoughts and thus progress cognitively. Generally, the more years of college education and life experience one has, the more likely one is to demonstrate advanced levels of reasoning. However, young adults who are not enrolled in college may advance cognitively if they are confronted with similar opportunities to be intellectually challenged, engage in social interaction and issue-focused discussions, and be confronted with multiple perspectives.

Expertise and Cognition

During the college years, we not only develop our thinking skills but also gain expertise in a given field. We choose a college major, or a field in which to specialize. As we take courses in that field, we develop a knowledge base that influences how we process information. This is also true regarding life experience, regardless of education. As we gain more experiences within a given context, we develop expertise, enabling us to think in more complex and efficient ways. Compared with novices, experts remember and reason more quickly and effectively. We develop more abstract ways of thinking about the material within our area of expertise, which helps us better organize and reason with it.

Moral and Self-Concept Development

Changes in cognitive development and in social experience also bring changes in moral development. We encounter moral dilemmas throughout our daily life. As we advance cognitively, we think in new ways about our lives. Events in our lives, such as committing to a relationship, job promotions, psychotherapy, and serious illness, can lead to a disequilibrium, a mismatch between our perspective and experience, and stimulate reflection. Reflecting on these experiences leads to deeper convictions about our values, self, and place in the world.

Vocation

Vocational exploration and choice begins in childhood, when we fantasize and imagine what different careers are like. In adolescence, we explore and evaluate potential careers in light of our skills and abilities, and choose educational experiences that prepare us for possible careers. In young adulthood, we narrow our options based on our experiences, interests, personalities, and opportunities. Our families and social contexts influence our vocational decisions in the sense that we tend to choose vocations similar to those to which we have been exposed. People who grow up in higher socioeconomic status homes and communities are more likely to select high status vocations such as lawyer, doctor, and scientist, whereas those who grow up in low-income homes and communities are more likely to consider less prestigious occupations. Those individuals who enter college often sample majors, to further exploration and determine where their interests lie. Then they choose a major and explore careers within that field. Some people may not choose an occupation until well after college. Occupational choice does not end with college graduation or entry into the first job. Unlike prior generations when adults could expect to put in a lifetime of work at the same company, retiring with a gold watch and a pension, most young adults can expect to be employed in a range of positions, even changing occupations several times through life. The consideration of various careers and vocational growth and change continues throughout young adulthood.

Young adults who do not attend college have more limited vocational choices. Twenty-five percent of young people with a high school diploma have no plans to go to college. North American young adults who do not attend college often find it hard to find a job other than the one held as a student. Of American recent high school graduates who do not continue their education, about 20% are unemployed. North American young adults who are not college bound have few alternatives to turn to for vocational counseling, training, and job placement. Many flounder after high school graduation because most North American employers perceive high school graduates as poorly prepared for occupations. When high school graduates find work, they often are limited to low-paid and unskilled jobs.

PSYCHOSOCIAL TASKS OF YOUNG ADULTHOOD

Young adults are faced with several psychosocial tasks: solidifying autonomy, further shaping and committing to an identity, and developing a capacity for intimacy.

Autonomy

Autonomy refers to self-governance, the ability to make decisions independently of others. Although the development of autonomy is a lifelong process beginning in toddlerhood and becoming more obvious in adolescence, many people do not establish a full sense of autonomy until young adulthood, when education is complete, work life has begun, and the individual is living on his or her own, apart from parents and formal institutions. A sense of autonomy permits young adults to maintain close bonds with family members, seek family members' advice in problem solving, and ultimately make and carry out their own decisions based on considering their values and opinions. The task for young adults is to gain experience and feel more comfortable in exerting their autonomy.

Identity

Like autonomy, identity development begins in adolescence when individuals experiment with possibilities and explore alternatives in order to ultimately make enduring decisions in the areas of career, love, and worldview. Identity refers to a sense of self. In young adulthood, the individual has committed to an identity and the commitment strengthens. The identity also undergoes change and refinement as the young adult takes on new roles, such as worker, spouse, and parent.

Intimacy

According to life-span development theorist Erik Erikson, the primary psychosocial task of young adulthood is developing a capacity for intimacy. The development of intimacy refers to the ability to establish close, committed relationships with others that will last a lifetime and that will support the individual's maturing identity throughout life. Managing this task entails balancing the opposing needs for independence, or autonomy, and connections, or intimacy. We learn to experience intimacy by making and maintaining important attachments with others. Intimacy entails giving of oneself, openness, and vulnerability—sharing without asking what will be received in return.

SOCIAL CHANGES OF YOUNG ADULTHOOD

Young adulthood is a time of great social change—we progress to full independence and take on adult roles. As we take on adult roles, the impulsivity characteristic of adolescence and emerging adulthood wanes. For example, after the early twenties, particularly college graduation, substance use, such as alcohol and marijuana consumption, declines.

Friendship

Friendship is important at all ages in life because it is a source of emotional support, positive feelings, and self-esteem. Young adulthood is a time in which we sort through and solidify existing friendships and make new ones. The overall absence of marital and family obligations permits young adults time to form extensive and varied social networks, forming friendships at college or at work; among political, cultural, athletic, or religious groups; and even on the commute to work or on vacation. Young adults have many social opportunities from which they select people who provide information, advice, companionship, and empathy.

Friends are usually similar in age, sex, and socioeconomic status. They also share common interests, experiences, and needs. Friends share their thoughts and feelings with one another, revealing themselves and making themselves vulnerable. In adult friendships, trust and loyalty are important. Friends often come and go throughout life, but some adult friendships continue for many years. Women are more likely to experience lifelong friendships and tend to see their friends more often than do men.

Women friends get together to talk. Male friends get together to do things such as play sports. Men are more likely to report barriers to intimacy such as feeling in competition with other male friends. Because they are free of marital and family obligations, open to new people, and exposed to many people, young adults in their early to middle twenties experience low levels of loneliness comparable to other ages in life. Young adults who live alone tend to form an extensive circle of friends and spend nearly as much time with friends as they do alone.

As young adults enter the thirties, family obligations and changing lifestyles cause some friendships to intensify and others wane. A lack of time, caused by juggling work, home life, and child care, makes maintaining friendships more challenging. Because we tend to form friendships with people who are similar to us, a change in marital status or parenting status can change the dynamics of friendship. Some friends, therefore, drift apart, and new friendships are made based on similarities such as children,

occupation, and neighborhood. Despite the changes, most people report a few lifelong friends.

Sexuality

In young adulthood, sexual activity increases in prevalence, with fewer people remaining virgins and more people regularly engaging in intercourse. Sexual activity increases through the twenties as people marry or cohabit. At around age 30, sexual activity begins to decline, despite few changes in hormonal levels. The decline in sexual activity is associated with the multiple roles and demands of adult life, work, family, and child care.

Males and females display a similar pattern of sexual activation, arousal, release through orgasm, refraction, and recovery. For males, sexual arousal and excitement can occur very quickly in response to many stimuli, in addition to or in lieu of an arousing partner. Over the course of young adulthood and particularly toward the end of young adulthood, males may notice a gradual increase in refractory period and slower arousal, requiring additional stimulation and additional time between arousal and full erection, erection and ejaculation, and orgasm and recovery.

Generally speaking, in females, sexual arousal, excitement, and orgasm take longer than in males. As females progress through young adulthood, arousal and orgasm become more likely. In adolescence, girls are often advised to protect their virginity and may be conditioned to resist their own desire, and instead emphasize their control over sexual experiences. In young adulthood, many women explore their sexuality through multiple partners and different sexual experiences, becoming more comfortable with and appreciating their sexuality, and experiencing orgasm on a regular basis.

Like friends, we tend to choose partners to date, cohabitate, or marry based on similarity. Our partners tend to be similar in age (within 5 years), education, ethnicity, and often religion. We tend to meet our partners for long-lasting relationships through introductions by family or friends, at work, school, or through activities based on common interests.

Cohabitation

Cohabitation refers to the lifestyle of unmarried couples who live together, sharing intimacy, a sexual relationship, and a residence. Cohabitation is more common today than ever before, especially among young adults. For example, more than one half of all women aged 25 to 40 in the United States have lived with a man outside of marriage. Many couples view cohabitation as an opportunity to test the relationship and get used to living together. Others view it as an alternative to marriage, a long-term arrangement with the rewards of companionship while maintaining independence. Homosexual adults often find no alternative to cohabitation because few states recognize homosexual relationships in formal partnerships. Increasingly, cohabitation includes children.

Marriage

Young adults are waiting longer than ever before to marry. The overall rate of first marriages in young adulthood is the lowest it has been in 50 years. Sixty percent of young adults aged 20 to 30 in the United States are not yet married, and 3% are already divorced. More young adults choose to remain single, cohabitate, and, after divorce, do not remarry.

The transition to marriage itself is a challenge. The transition to marriage entails a great deal of work in defining the relationship and each person's roles within the relationship. For example, negotiating the marital relationship requires deciding who does what in completing the myriad details of daily life. Who will cook? What will be eaten? When is leisure time and what is on the agenda? How will the household and financial tasks be decided? These decisions may be particularly challenging for today's young adults and therefore make the transition to marriage more difficult because of changes in gender roles and the tendency of young adults to live farther away from family members (and thus have fewer sources of support and guidance) than prior generations. Cohabitation before marriage may make marriage less of a turning point; however, many young adults report transitional stress despite prior cohabitation.

Generally, spouses with similar backgrounds in terms of socioeconomic status, education, religion, and age tend to report higher levels of marital satisfaction. Overall stability in other areas of life, such as stable financial and employment status, are also associated with higher levels of marital satisfaction. Although similarity in interests and in background is ideal, most successful married couples share some critical values and interests and learn to compromise, adjust, and agree to disagree about others.

The maturity of the partners also contributes to the overall success of a marriage. Generally, the younger

the bride and groom, the less successful the marriage. A full sense of identity is needed before one can establish intimacy. Because many young adults in their early twenties are still determining and solidifying their identity, shared intimacy, compromise, and growth as a couple are difficult. Before a full sense of identity is achieved, passion may be valued over the true predictors of marital success: openness, trust, loyalty, intimacy, and commitment. Young adults who married early may find that their values and roles diverge with those of their spouses as they mature. Those who wait until their late twenties and thirties to marry are less likely to divorce.

Divorce and Remarriage

About one half of all marriages in the United States end in divorce. Most divorces occur within 5 to 10 years of marriage. Divorce itself is a stressful experience for men and women, who both show signs of depression and anxiety, which typically declines within 2 years. Men show a more positive and quick adjustment when they remarry shortly afterward. Most women prefer their new single lives over unhappy marriages, despite increases in loneliness and reduced income. However, some women, particularly those who were in traditional marriages and who highly identified with their roles as wives, find divorce particularly challenging and are likely to remain anxious and depressed over time, experience drops in self-esteem, and tend to form other unsuccessful romantic relationships. Overall, the economic and psychological health of divorced women are enhanced by career advancement through education and job training and social support from family and friends.

After divorcing, two thirds of men and more than one half of women remarry. Typically, remarriage occurs within 4 years of divorce. Men remarry more quickly than do women. Remarriages face many of the same challenges of first marriages, with higher rates of divorce in the first few years. The practical reasons that often influence second marriages, such as financial security, social acceptance, relief from loneliness, and help in raising children, may not provide a basis for a solid marriage. Also, after a failed marriage, people may be more likely to view divorce as an acceptable solution when marital difficulties resurface. Finally, stepfamilies are stressful; children from prior marriages place stress on new marriages. Although the first few years of second marriages are at higher risk for divorce than first marriages (about 7% higher), afterward the divorce rates are about the same.

Parenthood

Recent generations of young adults have come to recognize parenthood as a choice. Some adults choose to remain childless and, because of changing cultural values, are less likely to experience social criticism and rejection than those of prior generations.

The physiological ability to produce children, reproductive capacity, is highest in the early twenties and declines with age. Females' ovulation is most consistent in young adulthood and becomes more erratic in the mid- to late thirties. Males, on the other hand, experience little to no change in sperm production throughout young adulthood. Despite their reproductive capacity, young adults are having children later in life than ever before. Most births occur to women older than 25. The number of women who give birth in their thirties is higher than ever. Families also are having fewer children, with the average number per couple at 1.8.

Young adults note many advantages of parenthood, particularly opportunities for love and change: the giving and receiving of warmth and affection, experiencing the stimulation and fun that children add to life, and the growth and learning opportunities that add meaning to life. They tend to report the sense of accomplishment and creativity from helping children grow and from someone to carry on after one's death as other advantages of parenthood. Parenthood is also an additional marker of adulthood; some young adults view parenthood as an opportunity to learn to be less selfish and to learn to sacrifice as well as to become accepted as a responsible and mature member of the community.

However, young adults also recognize that parenthood entails disadvantages, such as a loss of freedom, financial strain, and worries over children's health and well-being. Parenthood is associated with a decline in marital satisfaction; couples have less time to spend together and experience more stress and sleep loss. Parenthood is associated with a shift toward more traditional roles in the relationship such that the mother usually takes a larger role in child care. Women who have been very active in their careers before parenthood may find this transition particularly challenging and may experience a greater decline in marital satisfaction and mental health than men.

Couples who postpone parenthood until their late twenties and thirties tend to experience a less stressful and easier transition. Couples who have achieved some of their occupational goals and have acquired life experience and maturity navigate new parenthood more successfully and with less of a decline in marital satisfaction. Men in their late twenties and thirties tend to participate more actively in child care, and women this age are more likely to encourage their husbands to share in the housework and child care. Despite this, in most families, women manage most of the parenting, caregiving, and household responsibilities, which can lead to fatigue and stress and sometimes be a detriment to their careers.

SUMMARY

The twenties and early thirties, young adulthood, is a time of biological, cognitive, psychosocial, and social change. Our body reaches the peak of maturation and begins senescence. Our mind undergoes further development, permitting us to think in new ways. Young adults become more comfortable asserting their autonomy, further refine their identities, and develop a capacity for intimacy. Young adulthood is also a time in which we begin to make decisions about relationships. More young adults choose to remain single, cohabitate, and, after divorce, do not remarry. Those who marry do so at later ages than ever before, and about one half divorce. Likewise, young adults are waiting longer to become parents. In all, it appears that the social changes of young adulthood, the transition to marriage and parenthood, are delayed among today's young adults, as compared with prior generations. The nature of young adulthood itself is undergoing change as we proceed into the new millennium.

—Tara L. Kuther

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Z

Zone of Proximal Development

What the child can do in cooperation today he can do alone tomorrow. Therefore the only good kind of instruction is that which marches ahead of development and leads it; it must be aimed not so much at the ripe as at the ripening functions.

—Lev Vygotsky

ZONE OF PROXIMAL DEVELOPMENT (ZPD)

The zone of proximal development (ZPD), as a concept, was introduced by the Russian psychologist Lev Semenovich Vygotsky (1896–1934) in the early 1930s. The ZPD is situated within the context of children's education and cognitive development. It refers to an imaginary zone that represents the gap between what an individual can do independently with no assistance and what he or she can do with careful assistance by an adult or more competent member of his or her culture. Consistent with the Marxist principles of socialism and dialectical materialism of the time, Vygotsky's ZPD emphasizes the importance of social interaction and children's participation in sociocultural activities for learning and development.

The idea is that individuals learn best when working together with others during joint collaboration, and it is through such collaborative endeavors with more skilled persons that children learn and internalize new concepts, psychological tools, and skills. The main goal of education from this perspective is to keep children in their own ZPDs as often as possible by giving them interesting and culturally meaningful learning and problem-solving tasks that are slightly more difficult than what they do alone, such that they will need to work together either with another, more competent peer or with a teacher or adult to finish the task. The idea is that after completing the task jointly, the child will likely be able to complete the same task individually next time, and through that process, the child's ZPD for that particular task will have been raised. This process is then repeated at the higher level of task difficulty that the child's new ZPD requires.

Vygotsky originally proposed the idea of the ZPD in the context of assessing the skills and abilities of children with special needs in the form of serious physical, developmental, or learning disabilities. During the late 1920s, the Soviet Union encountered record numbers of mentally retarded and physical disabled children. Although standard methods of intellectual assessment, such as Binet's intelligence quotient (IQ) test, were becoming popular, Vygotsky's views differed. He argued that such measures limited the assessment of children's intellectual ability because they only assessed a child's individual "static" functioning and therefore missed the really interesting story—what children are capable of learning in the

future with help. He argued that children's intellectual assessment should be based on what they are demonstrating with the help of another person, not just what they can already do well by themselves. The ZPD became the central theoretical grounding for a very important and fairly recent movement, called "dynamic assessment," that has endeavored to develop assessment instruments that assess children's learning potential and ongoing learning processes, rather than just their static IQ.

Vygotsky would often give an example similar to the following for why the ZPD is important and why we need to take a dynamic approach to intellectual assessment. Suppose there were two boys who came to the clinic for intellectual assessment due to parents' and teachers' concerns over their learning and academic progress. Each child was given a standard IQ test, and both children performed identically on the static test, yielding an IQ score of 73. According to the standard procedure, these two children would be seen as having the same intellectual potential, and the same educational recommendations would be made for both children. However, let's imagine that both children were then given a dynamic assessment procedure in which a challenging cognitive problem-solving task was first given to the children for them to complete individually and the experimenter noted how well the child could perform the task. Each boy then participated in a 20-minute interactive joint (adult and child) teaching session in which the adult carefully assisted the child on the task and taught the child how it works while they completed the task together. Afterward, the child was given the same task again and asked to complete it on his own, and the experimenter noted how well he did now. One of the boys, it turns out, was able to learn the task easily and made huge gains in what he could do with the task by himself before and after the teaching session. The other child, however, made little gains and never really understood what to do with the task. He continued to struggle even though he had participated in the same sensitive teaching session with the adult as the other child, and his postteaching individual performance score was basically the same as it was before the joint session. According to the static IQ score, these two children are the same intellectually. However, it becomes clear from the dynamic teaching session that these two children are very different in their learning potential and capacity to benefit from instruction. The former child has a much wider ZPD than the latter, at least for this particular task, and the educational placement and curricular recommendations for the two boys are likely to be very different as well.

An important implication of Vygotsky's ZPD for teachers and parents is that it is the learning that takes place during social interaction between adults and children, and between children and other children, that spurs cognitive growth and development for the child. This places much responsibility on the part of teachers and parents as agents of development for children. The goal is to assess each child's ZPD for a given activity (know what the child's skill and motivation level are for a given task) and then pitch sensitive instruction to children at their upper limit of the zone. It is here where children learn with the support and guidance of capable instructors. As the child learns more and more and as his or her skill level increases, the teacher gradually reduces the assistance and gives the opportunity for the child to execute the task alone (a process called "scaffolding"). Eventually, the child masters the required skills needed to accomplish the task. Thus, it is through the teacher's guidance that the child is able to complete the task that he or she would otherwise not be able to complete. Once the task is accomplished, the result is the development of a new, higher ZPD.

A second important implication of Vygotsky's ZPD is the idea that we must assess children's cognitive potential dynamically, over time, and involving others providing assistance in the ZPD, as described earlier. Such assessment procedures provide information about what type of instruction works for the child and allow teachers to tailor their instruction to the student's actual needs rather than on the student's assumed needs based on his or her age or grade level, as is the case with standardized assessment procedures. Finally, the ZPD also suggests that children learn best in small groups, especially if the task is at the right level of difficulty.

Vygotsky's notion of the ZPD, originally developed in the 1930s in the Soviet Union, has much to offer contemporary educational and psychological practice. Indeed, the ZPD is probably the most widely known concept of all of Vygotsky's sociocultural theories, and it continues to inspire researchers and practitioners.

—Luis Espinoza and Adam Winsler

See also Scaffolding; Vygotsky, Lev

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ZYGOTE

At conception, a sperm from the father penetrates an egg from the mother, resulting in a zygote. A human zygote contains 46 chromosomes in two sets. One set is donated from the sperm (father), and the other set is donated by the egg (mother). The zygote will develop into a male if the sperm that fertilized the egg carries a Y chromosome, and the zygote will develop into a female if the sperm carries an X chromosome. The zygote also contains the appropriate factors necessary to direct the proper formation of the early embryo.

Monozygotic twins (identical) derive from the same zygote and share all of the same genetic material. Dizygotic (fraternal) twins derive from different zygotes and share only 25% of their genetic material, the same amount that any two siblings share.

Zygotes that receive an abnormal number of chromosomes from the gametes that joined together may be unviable or may produce an individual with a genetic syndrome such as Down's syndrome (an extra chromosome number 21), Turner's syndrome (only one X chromosome), or Klinefelter's syndrome (more than two sex chromosomes).

—Therese Poole

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Appendix 1

Tables and Figures on Selected Aspects of Human Development

Americans 65 Years and Older As a Percentage of Total U.S. Population, 1950–2050 1348

Annual Number of Births, 1946 to 2001 1349

Average Reading, Mathematics, and Science Literacy Scores of 15-Year-Olds, by Sex, 2000 1350

Basic Indicators of World Health Organization Members, 2001 1351

Child Care Arrangements of Preschool Children, by Age, Race/Ethnicity, and Type of Child Care Arrangement, 1999 1355

Death Rates for Leading Causes of Death for All Ages: United States, 1950–2002 1356

Enrollment in Grades K–8 and 9–12 of Elementary and Secondary Schools 1357

General Statistics of Public Libraries, by Population, 2000 1358

Health Insurance Coverage by Age Group in United States 1358

High School Graduates 1987–1988 to 2012–2013 1359

Life Expectancy in All Member States of World Health Organization in 2001 1360

Mortality Causes Under 5 Years Old in 2002 1364

Number of People Age 60 and Older 1364

Number of School-Associated Violent Deaths, 1992–2000 1365

Percent of Early Prenatal Care by Race: United States, 1980–2002 1365

Percent of Families With Income Below the Poverty Level 1366

Percent Overweight and Obesity by Age: United States, 1960–2002 1366

Percentage of Children Ages 3–5 Not Yet Enrolled in Kindergarten Who Participated in Home Literacy Activities With a Family Member Three or More Times per Week 1367

Selected Chronic Health Conditions Causing Limitation of Activity Among Working-Age Adults by Age: United States, 2000–2002 1367

Use of Illicit Drugs in the Past Month by Age, 2003 1368

Years of Life Lost in Thousands by Risk Factor and Sex, 2000 1369

Americans 65 Years and Older As a Percentage of Total U.S. Population, 1950–2050

Year	Total	65 years and over	75 years and over
1950	150,216,110	12,256,850	3,852,395
1960	179,325,657	16,207,237	5,359,338
1970	203,211,926	20,065,502	7,630,046
1980	226,545,805	25,549,427	9,968,822
1990	248,709,873	31,078,895	13,033,400
2000	281,421,906	34,991,753	16,600,767
2010	308,935,581	40,243,713	18,974,204
2020	335,804,546	54,631,891	22,852,732
2030	363,584,435	71,453,471	33,505,538
2040	391,945,658	80,049,634	44,579,726
2050	419,853,587	86,705,637	48,763,200

SOURCE: U.S. Census (2000).

Annual Number of Births, 1946 to 2001 (in thousands)

Year	*Number of births*	*Year*	*Number of births*
1946	3,426	1974	3,160
1947	3,834	1975	3,144
1948	3,655	1976	3,168
1949	3,667	1977	3,327
1950	3,645	1978	3,333
1951	3,845	1979	3,494
1952	3,933	1980	3,612
1953	3,989	1981	3,629
1954	4,102	1982	3,681
1955	4,128	1983	3,639
1956	4,244	1984	3,669
1957	4,332	1985	3,761
1958	4,279	1986	3,757
1959	4,313	1987	3,809
1960	4,307	1988	3,910
1961	4,317	1989	4,041
1962	4,213	1990	4,158
1963	4,142	1991	4,111
1964	4,070	1992	4,065
1965	3,801	1993	4,000
1966	3,642	1994	3,953
1967	3,555	1995	3,900
1968	3,535	1996	3,891
1969	3,626	1997	3,881
1970	3,739	1998	3,942
1971	3,556	1999	3,959
1972	3,258	2000	4,063
1973	3,137	2001	4,028

SOURCE: U.S. Department of Health and Human Services, National Center for Health Statistics (NCHS), Annual Summary of Births, Marriages, Divorces, and Deaths: United States, various years, *National Vital Statistics Report* (2003).

Average Reading, Mathematics, and Science Literacy Scores[1] of 15-Year-Olds, by Sex, 2000

	Reading literacy			*Mathematics literacy*			*Science literacy*		
Country	***Total***	***Male***	***Female***	***Total***	***Male***	***Female***	***Total***	***Male***	***Female***
Australia	528	513	546	533	539	527	528	526	529
Austria	507	495	520	515	530	503	519	526	514
Belgium	507	492	525	520	524	518	496	496	498
Canada	534	519	551	533	539	529	529	529	531
Czech Republic	492	473	510	498	504	492	511	512	511
Denmark	497	485	510	514	522	507	481	488	476
Finland	546	520	571	536	537	536	538	534	541
France	505	490	519	517	525	511	500	504	498
Germany	484	468	502	490	498	483	487	489	487
Greece	474	456	493	447	451	444	461	457	464
Hungary	480	465	496	488	492	485	496	496	497
Iceland	507	488	528	514	513	518	496	495	499
Ireland	527	513	542	503	510	497	513	511	517
Italy	487	469	507	457	462	454	478	474	483
Japan	522	507	537	557	561	553	550	547	554
Korea, Republic of	525	519	533	547	559	532	552	561	541
Luxembourg	441	429	456	446	454	439	443	441	448
Mexico	422	411	432	387	393	382	422	423	419
Netherlands	—	517	547	—	569	558	—	529	529
New Zealand	529	507	553	537	536	539	528	523	535
Norway	505	486	529	499	506	495	500	499	505
Poland	479	461	498	470	472	468	483	486	480
Portugal	470	458	482	454	464	446	459	456	462
Spain	493	481	505	476	487	469	491	492	491
Sweden	516	499	536	510	514	507	512	512	513
Switzerland	494	480	510	529	537	523	496	500	493
United Kingdom	523	512	537	529	534	526	532	535	531
United States	504	490	518	493	497	490	499	497	502

SOURCE: World Health Organization.

1. Average score equals 500.

Basic Indicators of World Health Organization Members, 2001

Member State	*Total population (in thousands)*	*Annual growth rate (%)*	*Percentage of population aged 60+ years*		*Total fertility rate*	
	2001	*1991–2001*	*1991*	*2001*	*1991*	*2001*
Afghanistan	22,473	4.5	4.7	4.7	7.1	6.8
Albania	3,144	–0.5	7.9	9.2	2.9	2.4
Algeria	30,841	1.9	5.7	6.0	4.3	2.9
Andorra	90	5.0	19.4	21.1	1.5	1.3
Angola	13,527	3.2	4.7	4.5	7.2	7.2
Antigua and Barbuda	65	0.3	9.1	10.0	1.9	1.6
Argentina	37,487	1.3	13.0	13.4	2.9	2.5
Armenia	3,787	0.5	10.4	13.2	2.2	1.2
Australia	19,338	1.2	15.6	16.5	1.9	1.8
Austria	8,074	0.4	20.0	21.1	1.5	1.3
Azerbaijan	8,095	1.1	8.2	10.5	2.7	1.6
Bahamas	307	1.7	6.7	8.1	2.6	2.3
Bahrain	651	2.6	3.7	4.8	3.6	2.4
Bangladesh	140,368	2.2	4.7	5.0	4.5	3.6
Barbados	268	0.4	15.1	13.2	1.6	1.5
Belarus	10,146	–0.1	16.8	18.8	1.8	1.2
Belgium	10,263	0.3	20.7	22.2	1.6	1.5
Belize	230	2.0	6.0	5.9	4.3	3.0
Benin	6,445	3.0	4.7	4.2	6.6	5.8
Bhutan	2,141	2.2	6.0	6.5	5.8	5.2
Bolivia	8,516	2.4	5.9	6.2	4.9	4.1
Bosnia and Herzegovina	4,066	–0.2	10.7	15.1	1.6	1.3
Botswana	1,553	2.0	3.6	4.6	5.0	4.1
Brazil[a]	172,558	1.4	6.8	8.0	2.6	2.2
Brunei Darussalam	334	2.4	4.0	5.2	3.2	2.6
Bulgaria	7,866	–1.0	19.5	21.7	1.6	1.1
Burkina Faso	11,855	2.5	5.2	4.8	7.2	6.8
Burundi	6,501	1.2	4.7	4.3	6.8	6.8
Cambodia	13,440	3.0	4.4	4.4	5.5	4.9
Cameroon	15,202	2.4	5.6	5.6	5.8	4.8
Canada	31,014	1.0	15.7	16.9	1.7	1.6
Cape Verde	436	2.3	6.8	6.3	4.1	3.3
Central African Republic	3,781	2.3	6.2	6.1	5.6	5.0
Chad	8,134	3.1	5.2	4.9	6.7	6.7
Chile	15,401	1.5	9.1	10.4	2.6	2.4
China	1,292,378	0.9	8.6	10.0	2.1	1.8
Colombia	42,802	1.8	6.3	7.0	3.1	2.7
Comoros	726	3.0	4.0	4.2	6.0	5.1
Congo	3,109	3.1	5.3	5.0	6.3	6.3
Cook Islands	20	0.7	5.8	6.9	4.1	3.3
Costa Rica	4,112	2.7	6.4	7.6	3.1	2.7
Côte d'Ivoire	16,348	2.3	4.3	5.0	6.1	4.8
Croatia	4,654	0.3	17.3	20.5	1.6	1.7
Cuba[a]	11,236	0.5	11.8	14.0	1.7	1.6
Cyprus	790	1.3	14.8	15.9	2.4	1.9
Czech Republic	10,260	0.0	17.8	18.6	1.7	1.2

a. Figures not endorsed by member state as official statistics.

(Continued)

(Continued)

Member State	*Total population (in thousands)*	*Annual growth rate (%)*	*Percentage of population aged 60+ years*		*Total fertility rate*	
	2001	*1991–2001*	*1991*	*2001*	*1991*	*2001*
Democratic People's Republic of Korea	22,427	1.0	7.8	10.4	2.4	2.1
Democratic Republic of the Congo	52,521	3.2	4.6	4.5	6.7	6.7
Denmark	5,332	0.3	20.3	20.2	1.7	1.7
Djibouti	643	2.2	4.1	5.7	6.3	5.9
Dominica	71	–0.1	9.1	10.0	2.1	1.8
Dominican Republic	8,506	1.7	5.5	6.7	3.3	2.8
Ecuador	12,879	2.1	6.2	7.0	3.7	2.9
Egypt	69,079	1.9	6.1	6.3	4.0	3.0
El Salvador	6,399	2.1	6.6	7.2	3.6	3.0
Equatorial Guinea	469	2.7	6.3	5.9	5.9	5.9
Eritrea	3,815	2.0	4.4	4.7	6.2	5.4
Estonia	1,376	–1.3	17.5	20.3	1.8	1.2
Ethiopia	64,458	2.8	4.5	4.7	6.9	6.8
Fiji	822	1.2	4.9	5.8	3.4	3.0
Finland	5,177	0.3	18.6	20.2	1.8	1.6
France	59,452	0.4	19.3	20.5	1.7	1.8
Gabon	1,261	2.7	9.1	8.6	5.1	5.4
Gambia	1,337	3.3	4.8	5.2	5.8	4.9
Georgia	5,238	–0.4	15.3	18.9	2.0	1.4
Germany	82,006	0.3	20.5	23.7	1.4	1.3
Ghana	19,733	2.4	4.6	5.1	5.5	4.3
Greece	10,623	0.4	20.4	23.7	1.4	1.3
Grenada	94	0.3	9.1	10.0	4.1	3.5
Guatemala	11,686	2.7	5.1	5.3	5.5	4.6
Guinea	8,273	2.7	4.4	4.5	6.5	6.0
Guinea-Bissau	1,226	2.4	5.9	5.6	6.0	6.0
Guyana	762	0.4	6.7	6.9	2.6	2.4
Haiti	8,269	1.6	5.7	5.6	5.1	4.1
Honduras	6,574	2.7	4.5	5.1	5.1	3.9
Hungary	9,916	–0.4	19.1	19.9	1.8	1.3
Iceland	281	0.9	14.6	15.1	2.2	1.9
India	1,025,095	1.8	6.9	7.7	3.8	3.1
Indonesia	214,839	1.5	6.3	7.8	3.2	2.4
Iran, Islamic Republic of	71,368	1.8	4.7	5.3	4.8	2.9
Iraq	23,583	2.9	4.5	4.6	5.8	4.9
Ireland	3,840	0.9	15.2	15.3	2.1	2.0
Israel	6,171	2.9	12.5	13.1	3.0	2.8
Italy	57,502	0.1	21.5	24.3	1.3	1.2
Jamaica	2,598	0.9	10.0	9.6	2.8	2.4
Japan[a]	127,334	0.3	18.0	23.8	1.5	1.4
Jordan	5,050	3.9	4.6	4.6	5.7	4.4
Kazakhstan	16,094	–0.4	9.7	11.2	2.6	2.0
Kenya	31,292	2.5	4.1	4.2	5.8	4.3
Kiribati	84	1.4	6.0	6.9	4.4	4.6
Kuwait	1,970	–0.6	2.1	4.8	3.4	2.7
Kyrgyzstan	4,986	1.2	8.3	8.9	3.6	2.5

a. Figures not endorsed by member state as official statistics.

Member State	*Total population (in thousands)*	*Annual growth rate (%)*	*Percentage of population aged 60+ years*		*Total fertility rate*	
	2001	*1991–2001*	*1991*	*2001*	*1991*	*2001*
Lao People's Democratic Republic	5,402	2.5	6.0	5.6	6.0	5.0
Latvia	2,405	–1.0	17.9	21.1	1.8	1.1
Lebanon	3,555	2.5	8.2	8.5	3.1	2.2
Lesotho	2,057	1.8	6.0	6.6	5.1	4.5
Liberia	3,107	4.0	5.2	4.4	6.8	6.8
Libyan Arab Jamahiriya	5,407	2.1	4.3	5.6	4.6	3.5
Lithuania	3,688	–0.1	16.4	18.8	1.9	1.3
Luxembourg	441	1.4	19.0	19.4	1.6	1.7
Madagascar	16,436	2.9	4.8	4.7	6.2	5.8
Malawi	11,571	1.8	4.3	4.7	7.3	6.5
Malaysia	22,632	2.2	5.8	6.7	3.7	3.0
Maldives	299	3.0	5.3	5.2	6.3	5.5
Mali	11,676	2.6	5.3	5.8	7.0	7.0
Malta	391	0.8	14.8	17.2	2.0	1.8
Marshall Islands	52	1.4	6.0	6.9	5.5	5.7
Mauritania	2,746	3.0	4.9	4.7	6.1	6.0
Mauritius	1,170	0.9	8.3	9.1	2.3	1.9
Mexico	100,367	1.7	5.9	7.1	3.3	2.6
Micronesia, Federated States of	126	2.6	6.0	6.9	4.8	5.1
Monaco	34	–2.9	18.4	20.5	1.8	1.8
Mongolia	2,558	1.2	5.9	5.6	3.8	2.4
Morocco	30,430	1.9	6.0	6.4	4.1	3.1
Mozambique	18,644	2.9	5.1	5.1	6.4	6.0
Myanmar[a]	48,363	1.6	6.7	6.8	3.9	3.0
Namibia	1,787	2.3	5.5	5.6	5.9	5.0
Nauru	13	2.6	6.0	6.9	4.4	4.5
Nepal	23,592	2.4	5.8	5.9	5.1	4.6
Netherlands[a]	15,929	0.6	17.4	18.4	1.6	1.5
New Zealand	3,807	1.1	15.3	15.7	2.1	2.0
Nicaragua	5,207	2.9	4.4	4.6	4.9	4.0
Niger	11,226	3.5	3.5	3.3	8.0	8.0
Nigeria	116,928	2.8	4.7	4.8	6.5	5.6
Niue	2	–1.4	5.8	6.9	3.2	2.6
Norway	4,487	0.5	20.8	19.6	1.9	1.7
Oman	2,621	3.5	3.8	4.3	6.9	5.6
Pakistan	144,971	2.6	5.6	5.8	5.9	5.2
Palau	20	2.3	6.0	6.9	2.6	2.8
Panama	2,898	1.7	7.3	8.2	3.0	2.5
Papua New Guinea	4,919	2.5	4.2	4.2	5.1	4.4
Paraguay	5,635	2.6	5.3	5.4	4.7	3.9
Peru	26,092	1.7	6.2	7.3	3.6	2.7
Philippines	77,130	2.1	4.9	5.6	4.3	3.4
Poland	38,576	0.1	15.1	16.6	2.0	1.3
Portugal	10,032	0.1	19.3	21.0	1.5	1.5

(Continued)

(Continued)

Member State	*Total population (in thousands)*	*Annual growth rate (%)*	*Percentage of population aged 60+ years*		*Total fertility rate*	
	2001	*1991–2001*	*1991*	*2001*	*1991*	*2001*
Qatar	574	2.1	2.1	3.3	4.3	3.4
Republic of Korea	47,068	0.8	7.9	11.3	1.7	1.5
Republic of Moldova	4,284	–0.2	12.9	13.6	2.3	1.5
Romania	22,387	–0.3	16.0	18.9	1.7	1.3
Russian Federation	144,663	–0.3	16.2	18.5	1.7	1.2
Rwanda	7,948	2.1	4.1	4.2	6.8	5.9
Saint Kitts and Nevis	38	–0.8	9.1	10.0	2.8	2.4
Saint Lucia	149	1.2	8.6	7.6	3.2	2.6
Saint Vincent and the Grenadines	114	0.7	9.1	10.0	2.2	1.9
Samoa	158	–0.1	6.1	6.7	4.7	4.3
San Marino	27	1.4	21.5	24.3	1.5	1.3
Sao Tome and Principe	140	1.8	6.8	6.3	6.2	6.0
Saudi Arabia	21,027	2.9	4.1	4.9	6.8	5.7
Senegal	9,661	2.5	4.6	4.2	6.2	5.2
Seychelles	81	1.4	8.3	9.1	2.1	1.8
Sierra Leone	4,587	1.1	5.0	4.7	6.5	6.5
Singapore	4,107	2.9	8.6	10.8	1.7	1.5
Slovakia	5,402	0.2	14.9	15.5	2.0	1.3
Slovenia	1,984	0.3	17.3	19.5	1.5	1.2
Solomon Islands	462	3.5	4.4	4.1	5.9	5.4
Somalia	9,156	2.4	4.2	3.9	7.3	7.3
South Africa	43,791	1.7	5.1	5.8	3.4	2.9
Spain	39,920	0.1	19.6	22.0	1.3	1.1
Sri Lanka	19,103	1.0	8.1	9.5	2.5	2.1
Sudan	31,809	2.3	5.0	5.5	5.4	4.6
Suriname	418	0.4	6.8	8.1	2.6	2.1
Swaziland	937	1.8	4.9	5.4	5.5	4.5
Sweden	8,832	0.2	22.6	22.7	2.0	1.4
Switzerland	7,169	0.4	19.2	21.7	1.5	1.4
Syrian Arab Republic[a]	16,609	2.7	4.5	4.7	5.3	3.8
Tajikistan	6,135	1.3	6.3	6.8	4.7	3.1
Thailand	63,583	1.4	6.4	8.3	2.2	2.0
The former Yugoslav Republic of Macedonia	2,043	0.6	11.8	14.6	1.9	1.6
Togo	4,656	2.8	4.8	4.9	6.3	5.5
Tonga	99	0.3	5.8	6.9	4.7	3.8
Trinidad and Tobago	1,299	0.6	8.8	9.7	2.3	1.6
Tunisia	9,561	1.4	7.0	8.4	3.4	2.2
Turkey	67,632	1.7	7.3	8.5	3.3	2.4
Turkmenistan	4,834	2.5	6.2	6.4	4.2	3.3
Tuvalu	10	1.4	5.8	6.9	3.6	2.9
Uganda	24,022	3.0	4.1	3.8	7.1	7.1
Ukraine	49,111	–0.6	18.6	20.7	1.7	1.1
United Arab Emirates	2,653	2.4	2.7	5.5	4.0	3.0
United Kingdom[a]	59,541	0.3	20.8	20.7	1.8	1.6
United Republic of Tanzania	35,964	2.9	3.8	4.0	6.0	5.2

a. Figures not endorsed by member state as official statistics.

Member State	*Total population (in thousands)*	*Annual growth rate (%)*	*Percentage of population aged 60+ years*		*Total fertility rate*	
	2001	*1991–2001*	*1991*	*2001*	*1991*	*2001*
United States of America[a]	285,925	1.1	16.6	16.2	2.0	2.0
Uruguay	3,360	0.7	16.5	17.2	2.5	2.3
Uzbekistan	25,256	1.9	6.5	7.1	3.8	2.5
Vanuatu	201	2.8	5.2	4.8	4.9	4.4
Venezuela, Bolivarian Republic of	24,631	2.1	5.8	6.7	3.4	2.8
Viet Nam	79,174	1.6	7.3	7.5	3.5	2.3
Yemen	19,113	4.6	4.1	3.6	7.6	7.6
Yugoslavia	10,537	0.3	15.6	18.4	2.0	1.6
Zambia	10,648	2.5	4.4	4.5	6.3	5.8
Zimbabwe	12,851	2.0	4.6	4.7	5.7	4.7

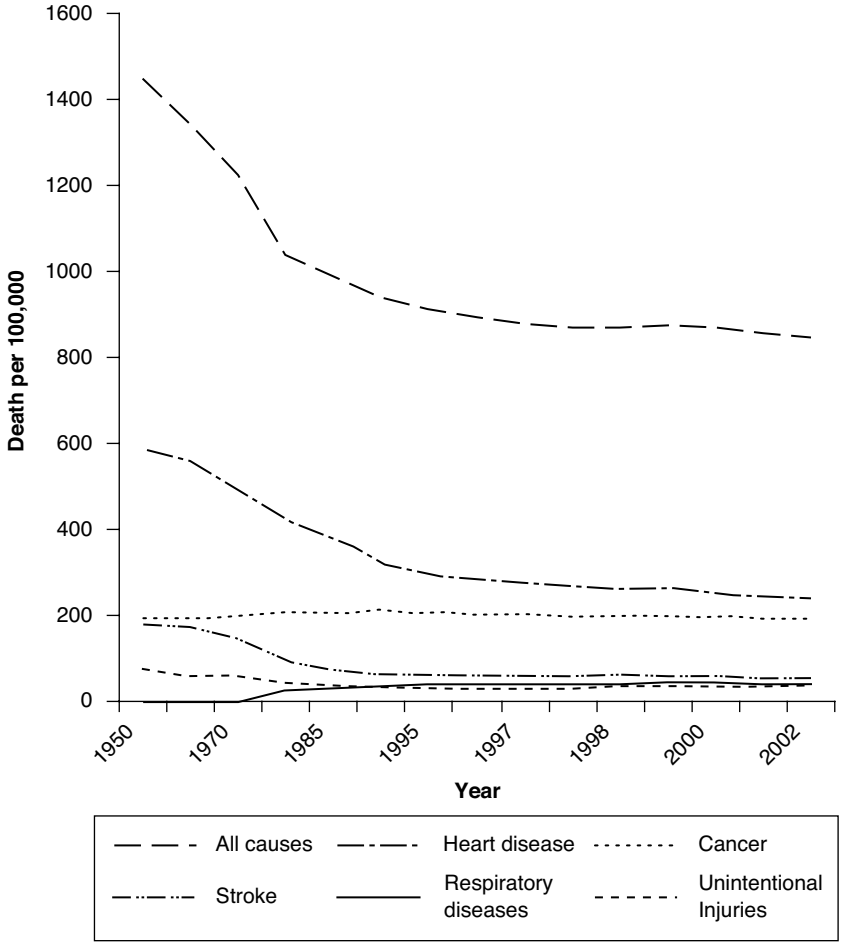
SOURCE: World Health Organization, *The World Health Report 2002.*

Child Care Arrangements of Preschool Children, by Age, Race/Ethnicity, and Type of Child Care Arrangement, 1999

	Percent in nonparental arrangements			
Characteristics	*Relative care*	*Nonrelative care*	*Center-based program*	*Percent with parental care only*
Total	22.8	16.1	59.7	23.1
		Age		
3 years old	24.4	16.2	45.7	30.8
4 years old	22	15.9	69.6	17.7
5 years old	20.2	16.1	76.5	13.5
		Race/ethnicity		
White, non-Hispanic	18.8	19.4	60	23.2
Black, non-Hispanic	33.4	7.4	73.2	13.7
Hispanic	26.5	12.7	44.2	33.4
Other	30.2	10.4	66.1	16.6

SOURCE: Department of Education.

Death Rates for Leading Causes of Death for All Ages: United States, 1950–2002



SOURCE: U.S. Department of Education.

Enrollment in Grades K–8 and 9–12 of Elementary and Secondary Schools (in thousands)

Year	*Total*			*Public*			*Private*		
	K–12[1]	*K–8*[1]	*9–12*	*K–12*[1]	*K–8*[1]	*9–12*	*K–12*[1]	*K–8*[1]	*9–12*
1988	45,430	32,537	12,893	40,188	28,501	11,687	5,242	4,036	1,206
1989	45,741	33,187	12,554	40,543	29,152	11,390	5,198	4,035	1,163
1990	46,451	33,962	12,488	41,217	29,878	11,338	5,234	4,084	1,150
1991	47,322	34,619	12,703	42,047	30,506	11,541	5,275	4,113	1,162
1992	48,145	35,264	12,882	42,823	31,088	11,735	5,322	4,175	1,147
1993	48,812	35,719	13,093	43,465	31,504	11,961	5,348	4,215	1,132
1994	49,610	36,233	13,376	44,111	31,898	12,213	5,498	4,335	1,163
1995	50,503	36,806	13,697	44,840	32,341	12,500	5,662	4,465	1,197
1996	51,375	37,316	14,060	45,611	32,764	12,847	5,764	4,551	1,213
1997	51,968	37,696	14,272	46,127	33,073	13,054	5,841	4,623	1,218
1998	52,475	38,048	14,427	46,539	33,346	13,193	5,937	4,702	1,235
1999	52,876	38,253	14,623	46,857	33,488	13,369	6,018	4,765	1,254
2000	53,385	38,584	14,801	47,223	33,709	13,514	6,162	4,875	1,287
2001	53,890	38,832	15,058	47,688	33,952	13,736	6,202	4,880	1,322
				Projected					
2002	54,158	38,827	15,331	47,918	33,942	13,976	6,241	4,885	1,356
2003	54,296	38,719	15,577	48,040	33,843	14,198	6,256	4,876	1,379
2004	54,455	38,541	15,914	48,175	33,669	14,506	6,279	4,871	1,408
2005	54,615	38,412	16,203	48,304	33,534	14,770	6,311	4,878	1,433
2006	54,907	38,522	16,385	48,524	33,589	14,936	6,383	4,933	1,449
2007	55,049	38,605	16,445	48,640	33,654	14,986	6,409	4,950	1,458
2008	55,124	38,766	16,358	48,690	33,791	14,899	6,434	4,975	1,459
2009	55,223	38,995	16,228	48,761	33,994	14,767	6,461	5,001	1,461
2010	55,386	39,283	16,103	48,890	34,243	14,648	6,495	5,040	1,455
2011	55,618	39,688	15,930	49,084	34,597	14,487	6,534	5,091	1,443
2012	55,946	40,154	15,792	49,367	35,006	14,361	6,579	5,148	1,430
2013	56,364	40,638	15,726	49,737	35,430	14,307	6,627	5,208	1,419

SOURCE: U.S. Department of Education.

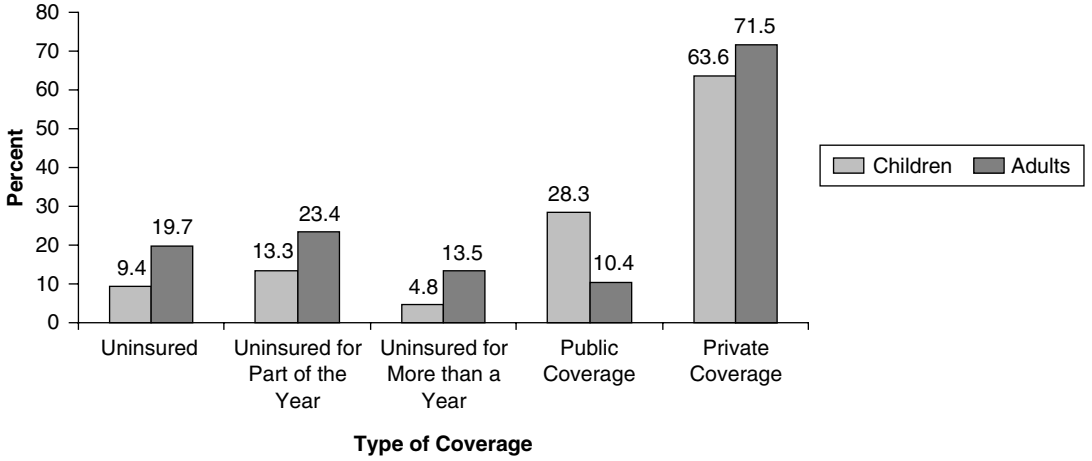
1. Includes most nursery school enrollment.

General Statistics of Public Libraries, by Population, 2000

Number of public library service outlets	17,182	5,749	4,205	1,790	2,140	1,108	2,190
Central libraries	8,915	5,423	2,582	499	281	73	57
Branch libraries	7,383	255	1,326	1,113	1,693	964	2,032
Bookmobiles	884	71	297	178	166	71	101
Collections, in thousands							
Books and serial volumes	760,513	99,639	185,480	91,633	112,461	75,126	196,173
Audio and video materials and films	54,021	5,456	13,020	6,662	8,241	5,184	15,458
Serial subscriptions	1,944	276	487	209	254	193	523
Paid staff, in full-time equivalents							
Librarians	43,118	6,016	11,317	5,156	6,018	4,195	10,416
Librarians with ALA-MLS	29,519	1,221	6,904	3,761	4,858	3,441	9,334
Other staff	86,984	5,479	20,404	11,770	15,787	9,492	24,053
Income, in thousands							
Total operating income	$7,702,768	$499,840	$1,744,932	$967,817	$1,246,162	$858,994	$2,385,022
Source of operating income (percent)							
Federal	0.7	1.5	0.6	0.6	0.7	0.6	0.9
State	12.8	7.8	12.3	15.2	11.6	13.0	13.3
Local	77.1	69.3	77.4	76.0	80.2	79.0	75.9
Other and private	9.4	21.4	9.8	8.2	7.5	7.4	10.0

SOURCE: U.S. Department of Education.

Health Insurance Coverage by Age Group in United States



SOURCE: Centers for Disease Control.

High School Graduates 1987–1988 to 2012–2013 (in thousands)

Year ending	*Total*	*Public*	*Private*
1988	2,773	2,500	273
1989	2,744	2,459	285
1990	2,589	2,320	269
1991	2,493	2,235	258
1992	2,478	2,226	252
1993	2,481	2,233	247
1994	2,464	2,221	243
1995	2,519	2,274	246
1996	2,518	2,273	245
1997	2,612	2,358	254
1998	2,704	2,439	265
1999	2,759	2,486	273
2000	2,833	2,554	279
2001	2,852	2,569	283
	Projected		
2002	2,917	2,630	287
2003	2,986	2,685	301
2004	3,002	2,698	305
2005	3,037	2,728	308
2006	3,101	2,785	316
2007	3,172	2,850	322
2008	3,262	2,931	331
2009	3,274	2,942	332
2010	3,262	2,930	331
2011	3,237	2,906	331
2012	3,202	2,870	331
2013	3,176	2,843	333

SOURCE: National Center for Educational Statistics.

Life Expectancy in All Member States of World Health Organization in 2001

Country	*Total*	*Males at birth*	*Males at age 60*	*Females at birth*	*Females at age 60*
Japan	73.6	71.4	17.1	75.8	20.7
Switzerland	72.8	71.1	16.9	74.4	19.4
San Marino	72.2	70.4	16.3	74.0	19.1
Sweden	71.8	70.5	16.5	73.2	18.5
Australia	71.6	70.1	16.4	73.2	18.8
Monaco	71.3	69.0	16.3	73.5	19.4
France	71.3	69.0	16.1	73.5	19.1
Iceland	71.2	70.5	16.8	71.9	17.6
Italy	71.0	69.2	15.5	72.9	18.2
Austria	71.0	68.9	15.7	73.0	18.5
Andorra	70.9	68.8	15.8	73.0	18.5
Spain	70.9	68.7	15.2	73.0	18.2
Norway	70.8	69.3	15.6	72.2	17.9
Luxembourg	70.6	68.6	15.1	72.7	18.3
Greece	70.4	69.0	15.7	71.9	17.1
New Zealand	70.3	69.1	15.9	71.5	17.7
Germany	70.2	68.3	15.0	72.2	17.7
Finland	70.1	67.7	15.2	72.5	18.1
Denmark	70.1	69.3	15.5	70.8	16.7
Netherlands	69.9	68.7	15.0	71.1	17.3
Canada	69.9	68.2	15.3	71.6	17.9
Belgium	69.7	67.7	14.8	71.8	17.8
United Kingdom	69.6	68.4	15.0	70.9	16.9
Israel	69.4	68.0	15.8	70.8	16.9
Malta	69.2	67.6	14.3	70.9	16.5
Ireland	69.0	67.6	13.9	70.4	16.1
Singapore	68.7	67.9	14.5	69.5	15.8
Slovenia	67.7	65.1	13.3	70.3	16.6
United States of America	67.6	66.4	14.9	68.8	16.6
Republic of Korea	67.4	64.5	12.9	70.3	16.6
Portugal	66.8	64.3	13.4	69.4	16.2
Czech Republic	66.6	63.8	12.8	69.5	16.0
Cuba	66.6	64.7	14.4	68.5	16.6
Cyprus	66.2	65.3	13.2	67.2	14.5
Chile	66.1	64.4	13.3	67.8	15.5
Kuwait	64.9	64.1	12.2	65.8	13.0
Costa Rica	64.8	62.6	12.9	67.0	15.3
Uruguay	64.7	61.2	12.3	68.3	16.8
Poland	64.3	62.1	11.9	66.6	14.6
Barbados	64.3	61.0	12.3	67.6	16.4
Slovakia	64.1	61.6	11.5	66.6	14.6
Panama	64.1	61.2	13.6	66.9	16.4
Mexico	63.8	62.6	14.5	65.0	14.9
Croatia	63.3	59.7	10.1	66.9	14.4
China	63.2	62.0	12.7	64.3	14.2
Argentina	63.1	60.6	11.9	65.7	15.1
Bulgaria	63.0	60.8	11.5	65.2	13.9
Jamaica	62.8	61.1	11.8	64.5	13.9

Country	*Total*	*Males at birth*	*Males at age 60*	*Females at birth*	*Females at age 60*
United Arab Emirates	62.5	61.7	10.6	63.3	12.3
Bosnia and Herzegovina	62.5	60.0	11.3	64.9	14.3
The former Yugoslav Republic of Macedonia	62.2	60.4	11.4	63.9	13.0
Yugoslavia	62.1	60.7	11.0	63.6	12.8
Dominica	62.1	59.4	13.0	64.8	15.0
Brunei Darussalam	62.0	60.4	10.5	63.7	12.8
Estonia	62.0	58.0	11.1	66.1	15.0
Bahrain	61.8	62.3	10.5	61.3	9.4
Hungary	61.8	58.0	10.4	65.5	14.4
Tunisia	61.3	58.9	10.8	63.7	13.4
Qatar	61.2	59.2	9.4	63.1	12.7
Lithuania	61.1	56.9	11.0	65.4	14.8
Venezuela, Bolivarian Republic of	61.1	57.1	11.6	65.0	15.0
Romania	60.9	58.6	11.1	63.3	13.5
Saint Kitts and Nevis	60.8	58.8	11.1	62.8	13.5
Saint Lucia	60.6	58.9	11.0	62.4	13.5
Cook Islands	60.5	58.3	10.2	62.6	12.7
Trinidad and Tobago	60.4	58.9	11.5	62.0	12.8
Oman	60.4	59.0	10.4	61.7	12.3
Malaysia	60.4	57.6	9.2	63.2	12.0
Latvia	60.0	55.2	10.0	64.9	14.4
Saudi Arabia	60.0	57.4	10.0	62.5	13.0
Saint Vincent and the Grenadines	59.8	57.5	11.3	62.2	14.0
Georgia	59.8	57.5	10.3	62.2	12.1
Turkey	59.8	58.5	11.2	61.1	12.4
Antigua and Barbuda	59.7	56.9	10.3	62.6	13.4
Libyan Arab Jamahiriya	59.6	56.8	9.8	62.4	12.9
Ecuador	59.5	56.6	11.6	62.4	14.2
Lebanon	59.4	56.5	10.0	62.2	12.9
Syrian Arab Republic	59.2	58.0	10.0	60.5	11.5
Seychelles	59.1	55.4	8.6	62.9	13.1
Niue	59.1	56.4	10.0	61.9	13.0
Belize	58.9	56.3	10.4	61.5	12.9
Sri Lanka	58.9	55.2	8.8	62.6	12.7
Fiji	58.8	56.8	10.0	60.8	12.3
Tonga	58.8	57.1	10.0	60.4	11.9
Colombia	58.7	55.3	10.7	62.1	12.9
Albania	58.7	55.9	8.8	61.5	12.7
Paraguay	58.7	55.4	9.6	61.9	12.9
Viet Nam	58.6	55.9	9.9	61.4	12.5
Bahamas	58.6	54.7	11.1	62.5	14.7
Thailand	58.6	56.4	12.0	60.8	12.6
Jordan	58.5	57.2	9.9	59.9	11.5
Belarus	58.4	53.9	9.5	62.8	13.0
Armenia	58.3	55.4	9.2	61.1	12.2
Algeria	57.8	55.8	10.3	59.9	12.2
Nicaragua	57.8	54.4	10.7	61.3	13.7

(Continued)

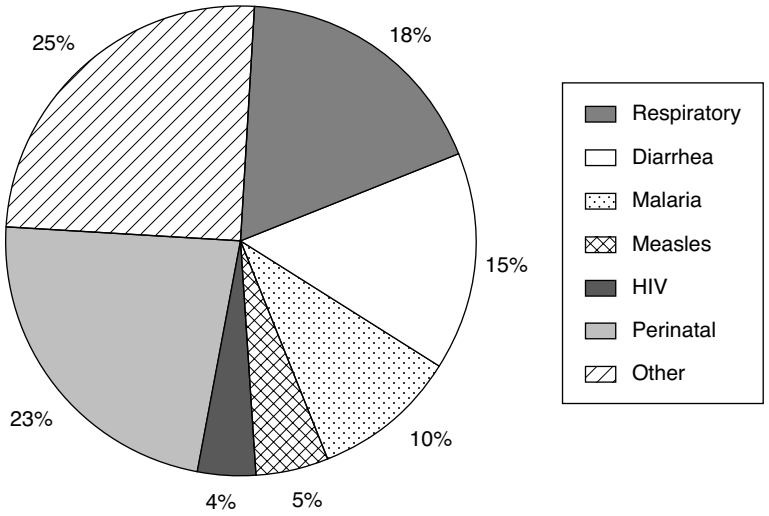
(Continued)

Country	*Total*	*Males at birth*	*Males at age 60*	*Females at birth*	*Females at age 60*
Samoa	57.7	56.0	9.3	59.5	11.6
Palau	57.7	55.5	9.2	59.9	11.7
Grenada	57.5	56.0	10.1	59.0	12.1
Republic of Moldova	57.5	54.2	9.3	60.8	11.7
Suriname	57.5	54.2	9.4	60.7	12.6
El Salvador	57.4	53.7	11.2	61.2	13.5
Peru	57.4	54.7	10.7	60.1	13.2
Ukraine	57.4	52.9	8.8	61.8	12.2
Mauritius	57.1	56.4	9.4	57.7	11.2
Iran, Islamic Republic of	56.7	55.5	9.8	57.9	11.4
Indonesia	56.7	56.1	10.6	57.2	11.1
Russian Federation	56.7	51.5	8.5	61.9	12.7
Egypt	56.7	56.4	9.4	57.0	9.2
Brazil	56.7	52.2	9.4	61.1	13.0
Cape Verde	56.5	52.2	9.2	60.8	12.3
Dominican Republic	56.4	53.0	9.7	59.8	13.1
Honduras	55.9	52.1	9.3	59.6	12.6
Micronesia, Federated States of	55.8	54.0	9.3	57.5	11.2
Democratic People's Republic of Korea	55.8	53.5	10.7	58.1	13.2
Philippines	55.5	51.1	8.0	59.8	11.9
Morocco	55.4	54.9	9.2	55.9	10.0
Vanuatu	54.9	53.4	8.9	56.3	10.8
Solomon Islands	54.8	52.6	8.7	56.9	11.0
Guatemala	54.3	51.4	10.4	57.2	11.6
Guyana	54.1	51.6	9.4	56.7	12.1
Mongolia	53.9	49.9	9.7	58.0	12.7
Tuvalu	53.9	52.0	8.8	55.7	11.0
Uzbekistan	53.5	50.9	8.2	56.1	10.8
Kiribati	53.2	51.1	8.7	55.4	10.8
Azerbaijan	52.8	50.3	8.5	55.4	11.0
Nauru	52.7	48.8	6.8	56.6	10.4
Marshall Islands	52.6	50.4	7.9	54.7	10.3
Kazakhstan	52.4	49.0	8.7	55.8	10.8
Bangladesh	52.1	51.7	9.4	52.6	10.9
Maldives	51.9	49.6	5.7	54.3	7.5
Kyrgyzstan	51.5	47.7	6.9	55.4	10.4
Bhutan	51.4	50.0	9.2	52.9	11.1
India	51.4	51.5	9.7	51.3	10.2
Sao Tome and Principe	51.4	48.1	8.2	54.7	10.8
Pakistan	50.9	50.4	9.3	51.5	10.8
Bolivia	50.8	48.0	8.4	53.6	11.0
Iraq	50.5	47.7	8.1	53.3	11.0
Turkmenistan	50.3	46.7	6.8	53.8	9.7
Tajikistan	50.1	47.0	8.4	53.2	11.8
Comoros	49.9	47.0	7.6	52.8	10.2
Gabon	49.9	48.2	9.1	51.5	11.0
Papua New Guinea	49.8	47.9	8.2	51.8	10.4
Myanmar	48.9	46.5	9.0	51.4	11.0

Country	*Total*	*Males at birth*	*Males at age 60*	*Females at birth*	*Females at age 60*
Nepal	48.9	48.7	8.9	49.1	10.5
Yemen	48.4	45.5	7.0	51.2	10.4
Gambia	48.0	45.1	7.8	51.0	10.3
Ghana	47.8	45.8	8.4	49.7	10.6
Cambodia	46.4	43.0	7.6	49.9	10.5
Sudan	45.5	42.9	7.4	48.1	9.9
Senegal	45.4	43.1	7.4	47.7	9.8
Madagascar	44.5	42.2	7.4	46.7	9.8
Lao People's Democratic Republic	44.2	42.4	7.5	46.0	9.8
Eritrea	44.1	42.3	8.0	45.9	10.3
Equatorial Guinea	43.8	41.7	7.7	45.9	10.0
Congo	43.0	40.9	7.7	45.2	10.6
Haiti	42.9	38.5	8.4	47.3	11.2
Togo	42.7	40.6	7.6	44.9	10.2
Guinea	42.4	40.0	7.3	44.7	9.6
Benin	42.1	40.1	7.1	44.1	9.5
Nigeria	41.9	40.0	7.0	43.8	9.5
Mauritania	41.6	39.6	6.9	43.6	9.4
South Africa	41.3	40.0	8.9	42.7	11.4
Kenya	40.8	39.5	8.1	42.1	10.7
Namibia	40.4	39.8	8.7	41.1	10.9
Cameroon	40.4	38.8	7.3	42.0	9.9
Djibouti	40.1	37.9	6.9	42.3	9.6
Ethiopia	38.8	36.9	7.0	40.7	9.4
Chad	38.7	35.9	6.3	41.5	9.3
Guinea-Bissau	38.3	36.1	6.9	40.6	9.4
Uganda	38.0	36.2	6.9	39.8	9.4
Côte d'Ivoire	37.8	36.3	7.3	39.3	9.7
United Republic of Tanzania	37.8	36.3	6.8	39.3	9.5
Liberia	37.5	35.3	6.6	39.6	9.1
Mozambique	36.0	34.4	6.9	37.7	9.5
Mali	35.7	33.7	6.5	37.7	9.2
Burkina Faso	35.1	33.9	7.0	36.3	9.4
Somalia	35.0	32.5	6.3	37.4	8.8
Democratic Republic of the Congo	34.8	32.3	6.3	37.3	9.2
Central African Republic	34.0	32.3	6.0	35.6	9.2
Swaziland	33.9	33.8	9.0	34.1	11.0
Rwanda	33.8	31.7	6.7	36.0	9.6
Burundi	33.7	31.7	6.8	35.7	9.6
Afghanistan	33.4	31.1	4.9	35.7	8.7
Lesotho	33.4	33.2	8.4	33.6	10.6
Niger	33.2	31.7	6.1	34.7	8.6
Botswana	32.9	33.0	9.1	32.7	12.2
Zimbabwe	31.3	31.6	8.6	31.0	10.7
Zambia	30.9	30.5	7.5	31.4	10.0
Malawi	29.8	29.0	7.2	30.7	9.5
Angola	28.7	25.7	5.8	31.7	9.2
Sierra Leone	26.5	24.0	5.5	29.0	8.5

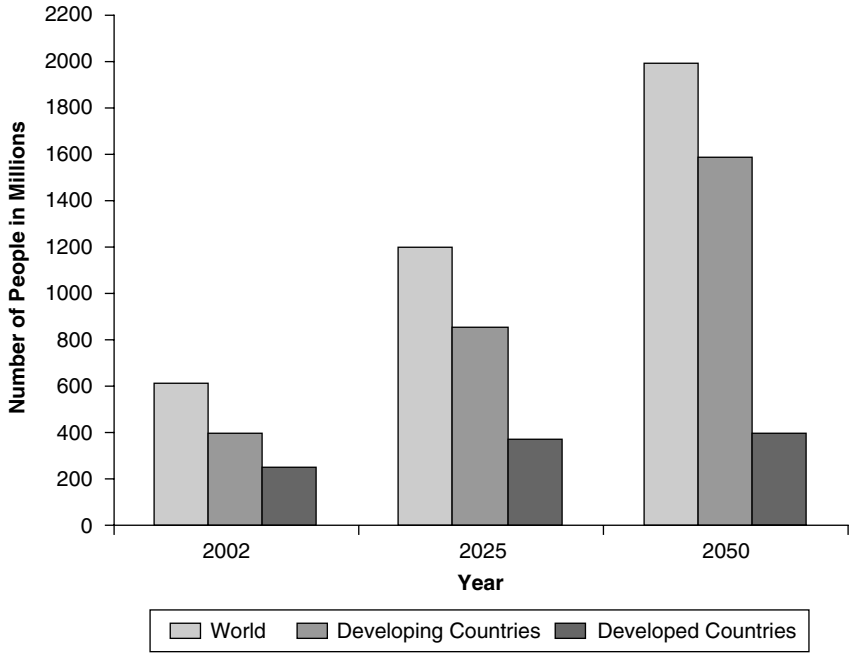
SOURCE: World Health Organization.

Mortality Causes Under 5 Years Old in 2002



SOURCE: World Health Organization.

Number of People Age 60 and Older



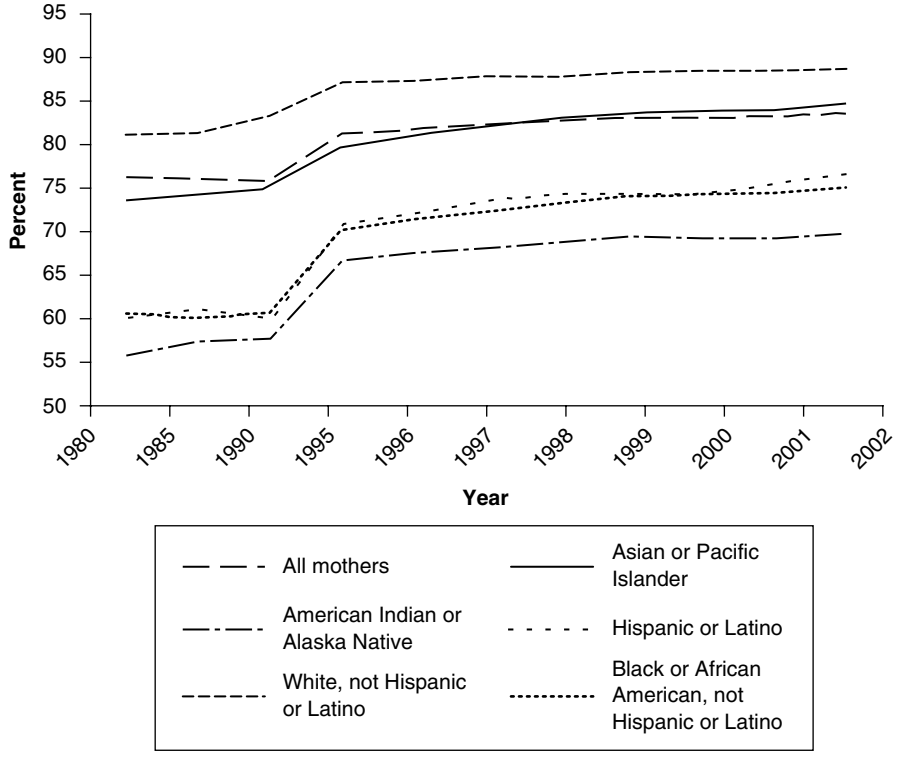
SOURCE: World Health Organization.

Number of School Associated Violent Deaths, 1992–2000

	Ages 5–19		*Ages 5–19*	
Year	*Homicides at school*	*Homicides away from school*	*Suicides at school*	*Suicides away from school*
1992–1993	34	3,583	6	2,199
1993–1994	29	3,806	7	2,263
1994–1995	28	3,546	7	2,220
1995–1996	32	3,303	6	2,113
1996–1997	28	2,950	1	2,108
1997–1998	34	2,728	6	2,055
1998–1999	33	2,366	4	1,855
1999–2000	16	2,124	6	1,922
Total	234	24,406	43	16,735

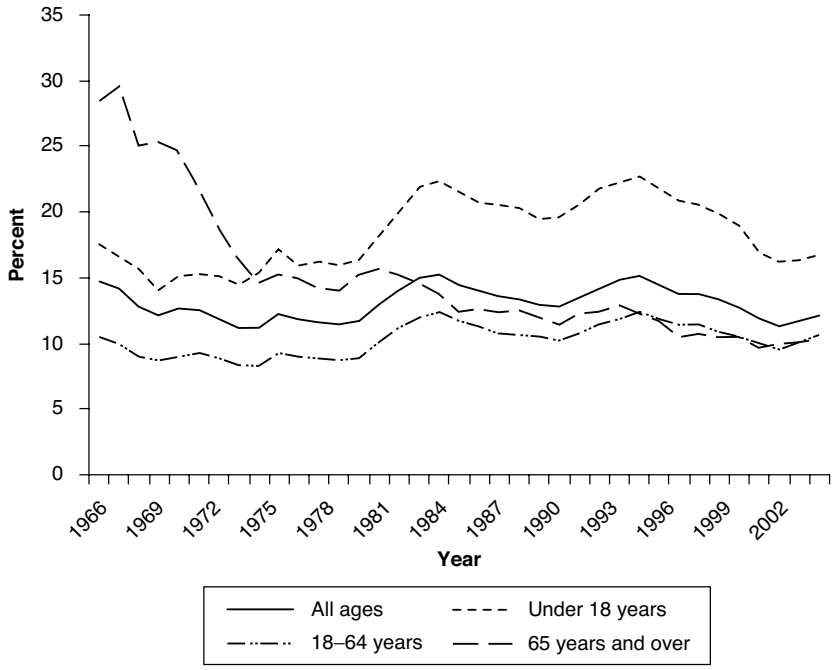
SOURCE: National Center for Education Statistics.

Percent of Early Prenatal Care by Race: United States, 1980–2002



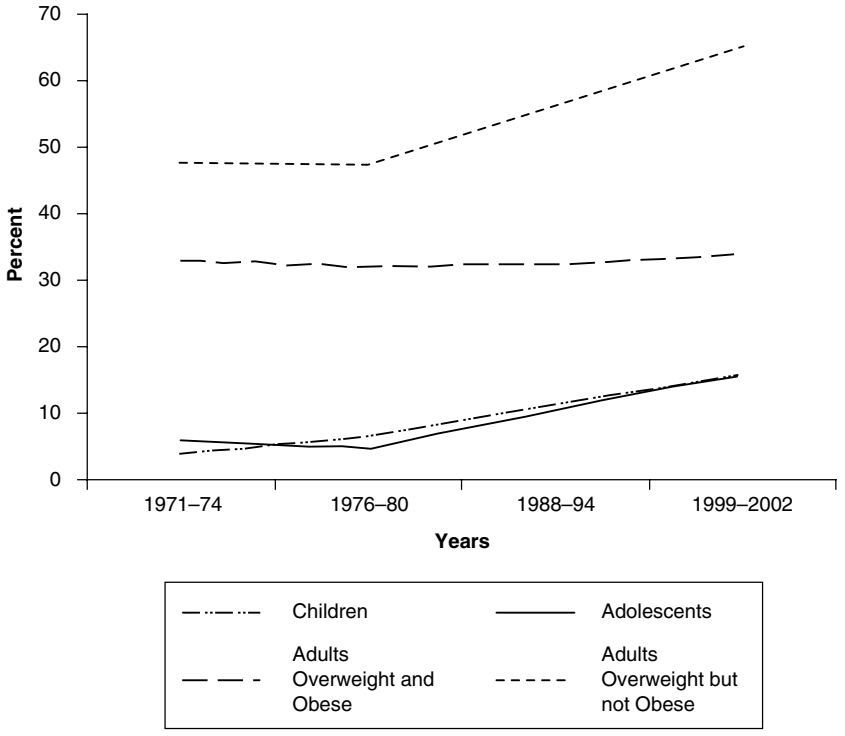
SOURCE: National Center for Education Statistics.

Percent of Families With Income Below the Poverty Level



SOURCE: U.S. Census Bureau.

Percent Overweight and Obesity by Age: United States, 1960–2002



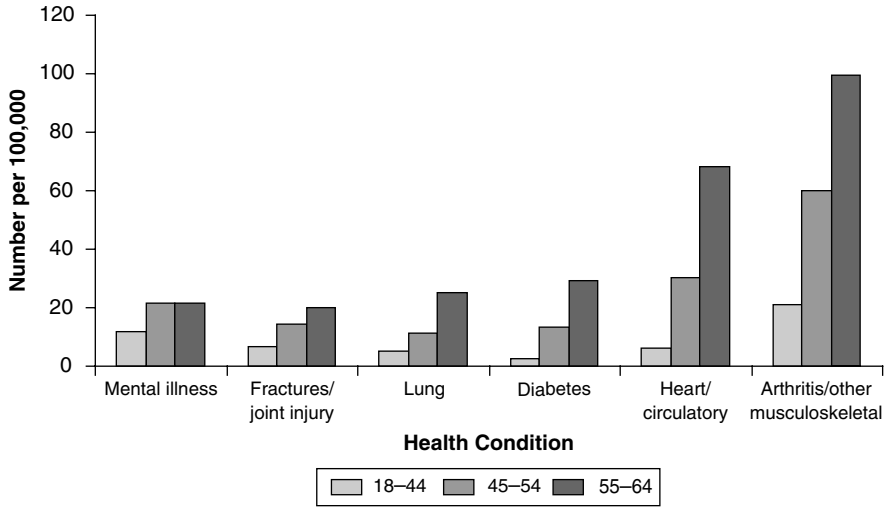
SOURCE: Centers for Disease Control.

Percentage of Children Ages 3–5 Not Yet Enrolled in Kindergarten Who Participated in Home Literacy Activities With a Family Member Three or More Times per Week

	Read to		*Told a story*		*Taught letters, words, or numbers*		*Taught songs or music*	
Child and family characteristics	1993	2001	1993	2001	1993	2001	1993	2001
Total	78.3	84.1	43	54.3	57.7	74.2	41	54.1
				Age				
3 Years	79.4	83.6	46.4	54.5	57.2	71.2	45	59.9
4 Years	77.8	85.2	41.2	54.6	58.1	77.1	38.9	51.7
5 Years	75.9	81.5	35.8	52	57.9	74.6	33.1	40.6
				Race/Ethnicity				
Asian/Pacific Islander	68.8	87.4	52.1	58.1	61.8	77.9	35.9	50.4
Black	65.9	76.7	39	51.2	62.7	77.5	48.9	53.9
White	84.8	89.4	44.3	57.9	57.2	74.8	40.2	53.4
Other[1]	75.9	86.5	48.1	61.8	56	78.4	31.3	57.9
Hispanic	58.2	70.7	37.7	42.3	53.9	68.2	38.7	56.6
				Poverty Status				
Below poverty threshold (poor)	67.5	73.7	39.1	50.7	59.6	72.4	45.2	57
At or above poverty threshold (nonpoor)	82.1	87.1	44.3	55.3	57	74.7	39.5	53.3

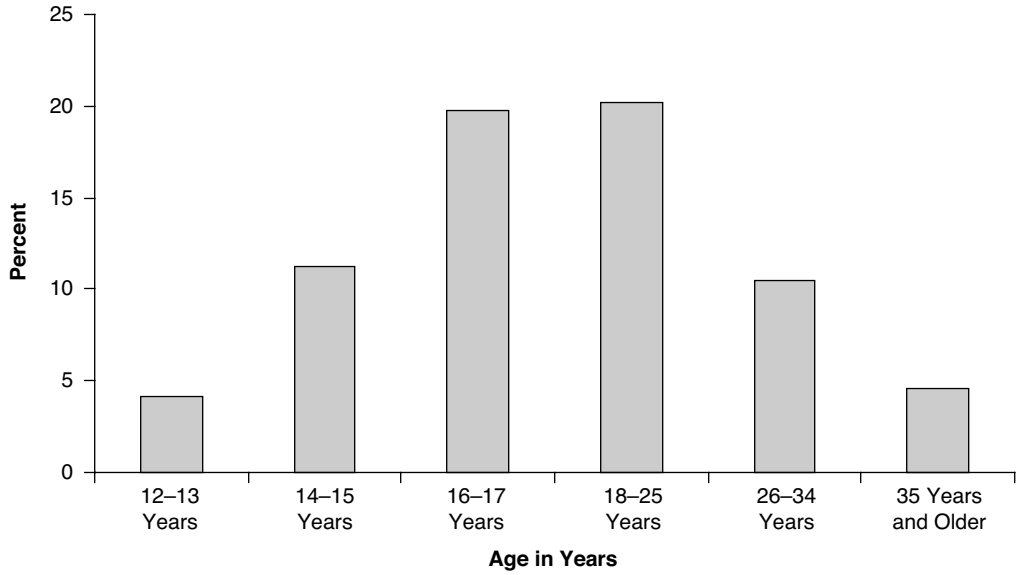
SOURCE: U.S. Department of Education, NCES, School Readiness and Early Childhood Education Program Participation Surveys of the National Household Education Surveys Program.
1. Other includes American Indian and Alaska Native.

Selected Chronic Health Conditions Causing Limitation of Activity Among Working-Age Adults by Age: United States, 2000–2002



SOURCE: U.S. Department of Education.

Use of Illicit Drugs in the Past Month by Age, 2003



SOURCE: U.S. Department of Education.

Years of Life Lost in Thousands by Risk Factor and Sex, 2000 (Global)

	Males	*Females*
Childhood and maternal undernutrition		
Underweight	64,119	62,766
Iron deficiency	11,891	13,967
Vitamin A deficiency	11,276	14,727
Zinc deficiency	13,459	13,167
Other diet-related risks and physical inactivity		
Blood pressure	30,206	25,342
Cholesterol	19,373	15,600
Overweight	11,276	11,868
Low fruit and vegetable intake	13,463	10,014
Physical inactivity	8,562	7,278
Sexual and reproductive health risks		
Unsafe sex	36,918	40,052
Lack of contraception	—	4,206
Addictive substances		
Tobacco	37,913	7,708
Alcohol	28,035	4,662
Illicit drugs	3,841	978
Environmental risks		
Unsafe water, sanitation, and hygiene	24,917	24,315
Urban air pollution	3,533	2,871
Indoor smoke from solid fuels	17,341	17,805
Lead exposure	1,888	914
Climate change	2,415	2,530
Occupational risks		
Risk factors for injury	6,674	433
Carcinogens	1,105	271
Airborne particulates	1,344	143
Ergonomic stressors	4	1
Noise	0	0
Other selected risks to health		
Unsafe health care injections	5,504	3,675
Childhood sexual abuse	784	908

SOURCE: World Health Organization.

Appendix 2

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Index

Abar, B., 147, 984
Abecedarian Research Project, 1–4, 428
  See also Early intervention programs
Abortion, 4–7
Abrams, L., 1266
Abstinence-only sex education, 1154–1155
Abstract reasoning, 7–8
  See also Cognitive development
Accommodation, 8–9, 281–282, 293
  See also Cognitive development
Achenbach, T. M., 364
Acitelli, L. K., 813
Ackerman, B. P., 1207
Ackerman, J. P., 536
Acquired immune deficiency syndrome (AIDS), 9–15, 264, 1246
  global impact of HIV, 14
  history of, 13–14
  HIV binding process, 9–10
  HIV-positive, 10, 658
  immune system function, 9–10, 678–679
  medical intervention for HIV, 10–11
  orphans in sub-Saharan Africa, 943, 944
  prevention of HIV, 12–13
  sexual activity and, 337, 1164, 1165
  summary on, 14
  transmission of HIV, 11–12
  See also Infectious diseases
ACT (American College Test), 114, 1098, 1100, 1101
Action research, 1058
Active euthanasia, 121, 481
  See also Euthanasia
Activities of daily living (ADLs), 15–16, 119, 933, 935, 1301
  See also Older adulthood
Activity theory, 16–23, 1265
  ability to act, agency and, 17
  contradictions and, 20–21
  hierarchical levels within, 17–18
  historical origins of, 16
  knowledge, learning, and development, 21–22
  nature of, 18–19
  structure of, 19–20
  summary on, 22–23
Acupuncture, 23–24, 952
ADA (Americans with Disabilities Act), 87–89, 224, 689, 787
Adams, G. A., 1083
Adams, M. A., 1178
Adams, P., 419
Adaptation, 24, 469
  See also Accommodation
Adaptive behavior, 828–829
Addiction, 24–27
  Alcoholics Anonymous (AA), 25, 69–70, 71, 398
  alcoholism and, 70–73
  cocaine, 271–274, 318, 397
  drug abuse and, 396–399
  gateway drug and, 553–554
  methadone and, 833–834
  See also Drug abuse
ADHD. *See* Attention deficit hyperactivity disorder (ADHD)
Adkins, P. M., 90
Adler, Alfred (1870–1937), 27–28, 176, 440, 936
  See also Ego
ADLs (activities of daily living), 15–16, 119, 933, 935, 1301
  See also Older adulthood
Adolescence, 28–35
  after-school programs (ASPs) and, 47–48
  authoritative parenting and, 146–147
  cognitive development in, 277–278
  developmental processes of, 28–30
  developmental stages of, 30–34
  egocentrism and, 670–671
  emotional development in, 457–458
  friendship and, 542–543, 981–983, 1196
  parent-child relationships, 963
  physical growth and development in, 1004
  sexual activity in, 337, 1162–1165
  socioemotional adjustment and, 545
  substance use in, 981–983
  summary on, 34–35
  See also Puberty
Adolescent development. *See* Adolescence
Adolescent sex offenders, 1160–1161
Adoption, 35–38, 247
Adoption and Foster Care Analysis and Reporting System (AFCARS), 35
Adoption and Safe Families Act (ASF), 531
Adoption Assistance and Child Welfare Act (AACWA), 531
Adult Attachment Interview (AAI), 131, 132, 133
Adult Protective Service (APS), 443, 444, 445, 446
Adult sex offenders. *See* Child abuse
Adultery, 384
Adulthood

attachment and, 131–132
cognitive development in, 278–279
exercise and, 488
friendship and, 543
hormones in, 647
physical growth and development in, 1004–1005
sensory changes in, 1145
social development in, 1196–1197
See also Older adulthood
Advance directives, 38–39
See also Death
Affectional solidarity, 65
Affeld, J., 669
African American Vernacular English (AAVE), 45
African Americans, 39–46
conclusion on, 46
cultural factors in dying and, 407–408, 483
culture of, 44–45
demographic characteristics, 41–43
equality and freedom for, 41
family characteristics, 43–44
holidays and celebrations of, 45–46
origins of, 40–41
After-school programs (ASPs), 46–49
for adolescents, 47–48
promising and problematic practices, 48
for school-age children, 47
summary on, 48
See also School
Age cohort, 286
Age discrimination, 49–51
See also Ageism
Age Discrimination in Employment act (ADEA) of 1967, 50, 51, 52, 1080
Age interval, 505
Age norms, 267
Ageism, 49, 51–52, 592
Agent, infectious, 708–709
Aggression, 52–59
anger/anger management and, 57–58
bullying and, 211–213
causes of, 52–54
child-rearing practices and, 55–56
conclusion on, 59
conflict and, 293–299
corporal punishment and, 311–312
definitions of, 52, 559
developmental progression of, 96–97
peer rejection and, 56–57
peer relationships and, 56, 1196
prevention of, 58
sex differences in, 1149–1150
theories of, 54–55, 95–96
treatment for, 97
See also Anger
Aging, 59–64, 773
Down syndrome and, 395
fine motor control and, 518–519
gerontology and, 574–576
hormones and, 648
neuroanatomical correlates of, 59–61
nonneuronal brain changes, 61–62
physical growth and, 1004–1005
psychosocial influences on brain-behavior, 62–64
summary on, 64
theories of, 1261–1266
See also Later adulthood
Aging parents, 64–66
Aging well, 66–68
AIDS. *See* Acquired immune deficiency syndrome (AIDS)
Ainsworth, Mary Salter (1913–1999), 68–69, 185, 251, 698, 1131, 1192
See also Attachment
Airborne allergens, 74–75
See also Allergy
Airborne transmission, 709–710
Ajzen, I., 141, 913
Albee, G., 369
Alcantara, A. A., 1279
Alcohol-related injuries, 720
Alcohol-related neurodevelopmental disorders (ARNDs), 512
Alcoholics Anonymous (AA), 25, 69–70, 71, 398
See also Alcoholism
Alcoholism, 70–73
addiction and, 24–27
Alcoholics Anonymous (AA), 25, 69–70, 71, 398
binge drinking and, 171–172
causes of, 72–73
classifications of, 70–71
costs and consequences of, 71–72
drunk driving and, 399–400, 805
Native Americans and, 886–887
summary on, 73
treatments for, 71
See also Addiction
Aldrich, N., 563
Alejano-Steele, A., 626, 804, 1301
Alexander, D., 883
Alleles, 73–74
Allen, L., 460, 961
Allen, R., 45
Allergic response, 74
See also Allergy
Allergy, 74–76
See also Asthma
Altmann, L. J. P., 81
Altruism, 76–79, 461–462, 1049, 1313
Altus, D. E., 1293
Alzheimer's disease (AD), 79–81, 135, 354, 395, 775, 800, 934
See also Dementia
Amato, P., 1220
Ambivalent-resistant attachment, 130
America, A., 359
American Academy of Pediatrics (AAP), 81–82, 269
American Association of Retired Persons (AARP), 49, 82–83, 586
See also Retirement
American Association on Mental Retardation (AAMR), 828

American Cancer Association (ACA), 194, 198, 217
American College of Sports Medicine (ACSM), 487
American College Test (ACT), 114, 1098, 1100, 1101
American Federation of Teachers (AFT), 312
American Medical Association (AMA), 447
American Power and the New Mandarins (Chomsky), 261
American Psychological Association (APA), 83–85
American Psychological Society (APS), 85–86, 475
American Sign Language (ASL), 86–87, 153, 342, 772
  See also Deafness
Americans with Disabilities Act (ADA), 87–89, 224, 689, 787
  See also Special needs children
Ames, Louise (1908–1996), 89, 669, 1267
Amnesia, 89–90, 800, 801, 823
  See also Long-term memory
Amory, J. K., 761
Amphetamines (AMP), 90–92
Analytic depression, 344
Anderman, E., 1120
Anderson, B., 478
Anderson, C. A., 1306
Anderson, D. I., 319, 1070
Anderson, G., 1295
Anderson, K. B., 59
Anderson, P. M., 306
Anderson, R. N., 883
Anderson, V. L., 462
Androgyny, 92–94
  See also Bisexuality
Andrus, E. P., 83
Anemia, 94–95
Anger, 95–98
  anger management programs and, 57–58
  definitions of, 95
  developmental progression of, 96–97
  summary on, 97
  theories of, 95–96
  See also Bullying
Anger management programs, 57–58
Angold, A., 1206
Animal behavior, study of, 479–480
"Animal Behaviour: A Synthesis of Ethology and Comparative Psychology" (Hinde), 480
Animal research, ethical principles of, 475
Anorexia nervosa, 98–101, 173
  characteristics/symptoms of, 98, 431–432, 1321
  development of, 99
  physical/medical complications of, 98
  prevalence of, 98
  psychological consequences of, 98
  treatment methods for, 99–100, 435–436
  See also Eating disorders
Antecedents, 782
Anterograde amnesia, 90
Anthony, S., 344
Anthrax bacilli vaccine, 680
Anti-semitism, 101–103, 754
  See also Holocaust
Antidepressant medication, 358
Antisocial behavior, 103–105
  comorbidity and, 103–104
  definitions of, 103
  impact on children/family, 104
  intervention efforts, 104–105
  psychopathology of, 367, 368
  See also Aggression
Antisocial personality disorder (ASPD), 350
Anxiety disorders, 105–108, 218
  causes of, 107, 570
  definitions of, 107, 569–570, 995
  intervention efforts, 107–108, 570–571
  signs of anxiety, 106
  trait and state anxiety, 106–107
Apgar, Virginia (1909–1974), 108–109
Apgar score, 108, 621–622
Apnea, 109–110, 1181
Appel, J. B., 274
Appelhans, B., 199
Applied behavior analysis (ABA), 110–112, 148, 1179
Apraxia, 152
Aptitude, 112–113
  See also Aptitude tests
Aptitude Testing (Hull), 114
Aptitude tests, 113–114
Archibald, M. E., 882
Archival research, 1058
Area Agencies on Aging (AAA), 930
Armed Services Vocational Battery (ASVAB), 114
Arndt, J., 1139
Arnett, J., 454
Arousal, excitation transfer theory of, 54
Arteriosclerosis, 114–115, 619
ASL (American Sign Language), 86–87, 153, 342, 772
  See also Deafness
Aspects of the Theory of Syntax (Chomsky), 1290
Asperger, H., 116
Asperger syndrome, 116–118, 135, 987–988
  See also Pervasive developmental disorders (PDDs)
Assimilation, 8, 24, 118–119, 281
  See also Cognitive development
Assisted living, 119–121, 935
Assisted reproductive technologies (ART), 711–712, 1241
Assisted suicide, 121–122, 1088
  See also Suicide
Association for Gerontology on Higher Education (AGHE), 573
Association for Retarded Citizens (ARC), 688
Associational solidarity, 65
Asthma, 76, 122–124, 264
Astone, N. M., 1205
Astuto, J., 961
Athletics, 124–126
Atoms of Language, The (Baker), 1291
Attachment, 126–133
  adoption identity and, 36–37
  in adulthood, 131–132
  child rearing and, 251–257
  debates/current trends in the study of, 132–133
  ethological attachment theory, 128–129, 1222, 1223

failure to thrive and, 500–501
historical roots of, 126–128, 185
individual differences in, 129–131
intimacy and, 733–734
parent-child attachment, 962, 971
secure attachment, 1131–1132, 1192
separation anxiety and, 105, 1146–1147
social development and, 1192–1193
temperament and, 132, 255, 1256–1257
Attachment (Bowlby), 128, 185
Attachment Q-Sort, 131
Attachment theory. *See* Attachment
Attanasio, R., 646, 679, 681, 1246, 1297
Attanucci, J., 581
Attention, 133–135
See also Attention span
Attention deficit hyperactivity disorder (ADHD), 136–138
assessment for, 137, 368
attention and, 133–136
causes of, 136
delinquency and, 350
description of, 136, 361, 786
developmental course of, 137
frequency of, 136–137
private speech and, 1035–1036
treatment for, 137–138, 351, 965, 1090–1091
Attention span, 138–140
See also Attention deficit hyperactivity disorder (ADHD)
Attentional control, 134
Attitude, 140–142
Attribution retraining, 144
Attribution theory, 142–144
applications of, 143–144
consequences of causal ascriptions, 142–143
dimensional theory and, 142
future directions/conclusion on, 144
Auditory amplification. *See* Cochlear implant
Authoritarian parenting style, 145–146, 254, 1193
See also Parenting
Authoritative parenting style, 146–147, 254–255, 1193
See also Parenting
Autism, 147–149, 986
Asperger syndrome, 116–118, 135, 987–988
attention and, 135
conclusion on, 148
definitions of, 147–148
diagnosis of, 361, 370
echolalia and, 438
intervention efforts, 148
language development and, 152
prosocial behavior in, 1039
Autistic spectrum disorder (ASD), 370
See also Autism
Autonomy, 1338
Average life expectancy, 149–150
Axel, R., 1182
Aykin-Burns, N., 777
Aylsworth, A. S., 573, 993
Ayotte, B. J., 1303
Babbling, 151–153, 768
See also Language development
Babinski, J. F. F., 153
Babinski reflex, 153
Baby boomers, 154, 1199
See also Middle adulthood
Baby talk, 155
See also Language development
Bacterial infections, 1166
Baddeley, A. D., 1167, 1168
Baer, D. M., 111, 112
Bailey, D. B., 326
Bailey, R., 1007
Baillargeon, R., 922
Baker, M. C., 1291
Balaban, M. T., 229, 356, 490, 1096, 1145, 1219
Baldwin, J. M., 441, 461
Baldwin, M. W., 1191
Baltes, M. M., 839, 1261
Baltes, P. B., 839, 1261
Baltimore Longitudinal Study of Aging (BLSA), 156–157
Bandura, Albert (1925–), 157–158, 222, 560, 567, 922, 1269
See also Theories of development
Bar/Bat Mitzvah, 158, 748
See also Religion
Bar-On, R., 459
Barbarin, O., 2
Baris, M., 386
Barker, D., 515
Barker, Roger (1903–1990), 159
Barkley, R. A., 965
Barlow, D. H., 957
Barnett, W. S., 3, 985
BarOn Emotional Quotient Inventory, 459
Barr, R., 675, 700
Barsky, R. F., 758, 1291
Bartholomew, K., 734
Barton, J. L., 138
Bartsch, K., 360
Bashford, A., 370
Bass, J., 760
Basso, M. R., 875
Bates, J. E., 1038
Bateson, P., 899
Bateson, P. P. G., 324, 326
Batshaw, M. L., 683
Battered child syndrome (BCS), 159–160
See also Child abuse
Battered woman syndrome (BWS), 160–162
See also Domestic violence
Bauer, D. J., 905
Bauer, P. J., 349
Baumrind, Diana (1927–), 161–162, 254, 378, 969, 984, 1193
See also Parenting
Bayer, M., 813
Bayley, Nancy (1899–1994), 162–163, 922
Bayley Scales of Infant Development (BSID), 163, 861, 922
Beal, L., 879

Beattie, J., 1289
Beauchamp, A. S., 282, 1037, 1114
Becker, E., 1137
Becker, G., 393
Behavior modification therapy, 104, 107, 920
Behavioral inhibition, 107
Behavioral topography, 111
Behr, B. R., 454
Bell curve (normal curve), 912
Bellugi, U., 771, 772
Belmont Report, 476
Bem, S. L., 561, 565, 567
Bem Sex Role Inventory (BSRI), 92, 93
Ben-Zeev, S., 169
Benedict, R., 813
Bengston, V. L., 727, 1261
Benigno, J. P., 1029
Bennett, K., 823
Bennett, T., 6
Bennett Mechanical Comprehension Test (BMCT), 114
Benson, E., 796
Benson, J. B., 425
Bereavement, 163–166
  characteristics of grief and mourning, 164
  culture and, 165–166
  elements of grief and mourning, 164
  factors that influence, 165
  in hospice care, 654
  summary on, 166
  theories/models of grief and mourning, 164–165
  See also Death
Bereavement overload, 166–167
Bereavement rituals. *See* Funerals
Berenbaum, S., 560
Berger, H., 453
Berger, L., 546
Berkeley Growth Study (BGS). *See* Berkeley/Oakland longitudinal research
Berkeley/Oakland longitudinal research, 167–168
  See also Longitudinal research
Berko-Gleason, J., 771
Berntson, G. G., 1067
Berthenthal, B. I., 699, 1310
Bessemer, H., 521
Betz, N. E., 222, 224
Bialystok, E., 169
Bianoc, D., 449
Bickham, D. S., 1334
Big School, Small School (Barker), 159
Bijou, S. W., 111
Bilingual education. *See* Bilingualism
Bilingual Education Act, 467
Bilingualism, 168–170
  bilingual education, 169–170
  childhood, 168–169
  historical background, 466–467
  social implications of, 170
  summary on, 170
  See also Language development
Binet, Alfred (1857–1911), 171, 724, 735, 827
  See also Intelligence
Binge drinking, 171–172
  See also Alcoholism
Binge eating, 172–173, 210, 375, 432
  See also Eating disorders
Biofeedback, 138
Biological clock, 173–174, 267
Biological Foundations of Language (Lenneberg), 169, 766, 772
Biological theories of aging, 1265–1266
Biopsy, 216
Biphobia, 182–183
Bipolar disorder, 847
Birch, H. G., 255
Birth, at home, 637–639
Birth and Death of Meaning, The (Becker), 1137
Birth cohort, 286
Birth control. *See* Contraception
Birth defects, 174–176
Birth of Pleasure, The (Gilligan), 579
Birth order, 176–178, 504
Birth weight, 178–179, 620, 666, 703
  See also Low birth weight (LBW)
Birthing centers, 179–180
Bisexuality, 180–183
  biphobia, 182–183
  bisexual identity development, 181
  continuum of, 181
  summary on, 183
  theoretical models of, 181–182
  See also Homosexuality
Bizzell, R. P., 846
Bjorklund, D. F., 350
Black, J. E., 190
Black colleges/universities, early, 627
Black Muslims, 45
Blakeslee, S., 385
Blanton, P. W., 27
Bleich, J. D., 269
Bleuer, E., 1105
Blindness, 175, 1144
Bliss, T. V., 190
Blood alcohol content (BAC), 400
Bloomfield, L., 1289
Blount-Matthews, K. M., 133, 1224
BMI (body mass index), 183–184, 374
  See also Weight
Body mass index (BMI), 183–184, 374, 919, 920, 1321
Boldt, A. M., 953
Bonner, M. J., 955
Bonvillian, J. D., 87
Boorstein, H. C., 989
Boredom susceptibility, 1141
Bornstein, M. H., 326, 966, 1204
Borrego, J., 250
Bouchard, T., 1282
Bowers, J. M., 767
Bowlby, John (1907–1990), 185, 251, 325, 733, 1192, 1222
  See also Attachment

Brace, C. L., 531
Brachytherapy, 216
Bradley, R. A., 891
Bradley, R. H., 1204, 1206
Brain aging. *See* Aging
Brain death, 185–186
Brain development, 186–188
  in adolescence, 30–31
  anatomical asymmetry, 188–189
  central nervous system (CNS), 186–187, 191, 325, 486
  cognitive development and, 279–280
  in early childhood, 419–420
  electroencephalogram (EEG) and, 452–453, 1180, 1233
  in the fetal period, 510–511
  influence of neural communication on, 188
  plasticity and, 189–192
  precursor cells and, 187
  sex differences in, 1147–1148
  summary on, 188
Brain imaging, 1232–1235
Brain lateralization, 188–189
  See also Brain development
Brain plasticity, 189–192
  developmental *vs.* adult plasticity, 190
  experience-induced plasticity of neurons, 190
  following injury, 191–192
  model of, 190–191
  vascular plasticity of the brain, 191
  See also Brain development
Branch, M. N., 941
Brandell, J. R., 1043
Braver, T. S., 529
Braxton-Hicks contractions, 1018
Brazelton, T. Berry (1918–), 192–193, 902
  See also Infancy
Brazelton Neonatal Behavioral Assessment Scale (NBAS), 622
Brazelton Way (Brazelton), 192
Breast cancer, 193–199, 217
  future directions in treatment of, 198–199
  medical aspects of, 193–195
  psychological aspects of, 195–198
  See also Cancer
Breast-feeding, 816, 916
Breathing reflex, 199–200
  See also Reflexes
Breech birth, 200–201
Bregman, J., 108
Bretherion, I., 69
Bright, J. E. H., 1332
Britto, P. R., 260
Brody, E. M., 15
Brody, L. R., 559
Brodzinsky, D., 36
Bronfenbrenner, Urie (1917–), 201–202, 438–439, 1060
  See also Ecological theory
Bronson, J. C., 183, 1064
Brookhart, S., 86
Brooks-Gunn, J., 1205, 1207
Brown, A., 833
Brown, B. B., 336, 1196
Brown, E., 1207
Brown, E. D., 1207
Brown, J. L. M., 468
Brown, M., 955
Brown, R. T., 326, 683, 790, 818, 1085, 1281
Brown, Roger (1925–1997), 202–203, 820
Brown, S. D., 222
Brown, S. L., 1314
Brown v. the Board of Education of Topeka, Kansas (1954), 41
Browne, J. V., 1031
Bruch, H., 99
Bruer, J. T., 326
Bruner, Jerome (1915–), 203, 1102
Bubany, S. T., 1092
Buck, L., 1182
Buck, R. M., 793
Buckley, J., 1165
Buddhism, 203–210
  basic tenets of, 204–207
  life of the Buddha, 204–205
  Mahayana Buddhists, 207–208
  main practices of, 208–210
  Theravadan Buddhists, 207
  See also Religion
Bulimia nervosa, 173, 210–211, 432, 436
  See also Eating disorders
Bullwinkel, D. M., 82
Bullying, 211–213
  assessment and school interventions, 213
  characteristics/adjustment of bullies, 212
  characteristics/adjustment of victims, 212–213
  conflict and, 293–299
  gender considerations, 211–212
  peer victimization and, 57, 211–213, 1122
  prevalence of, 211
  See also Aggression
Burch, R., 475
Burchinal, M. R., 2
Burgess, M. C. R., 227, 540, 892
Burgess, S., 314, 788, 832, 1000
Burrow-Sanchez, J. J., 963
Burstein, J., 579
Burwinkle, T. M., 920
Bush, G. W., 237
Buss, D. M., 858
Butler, R. N., 49, 51

Cain, K. M., 1123
Calkins, S., 701
Campbell, D. T., 1061
Campbell, F. A., 3
Campos, J. J., 319, 1070, 1310
Camune, B., 687
Cancer, 215–218
  breast cancer, 193–199, 217
  childhood, 215, 264
  coping with, 217
  prevention of, 217

prostate, 217, 1040–1041
statistics on, 215
survival rates, 216
surviving cancer, 217
symptoms of, 215
treatments for, 216
Cannizzo, S., 1118
Canny, S., 822
Cantu, C. A., 871
Caporino, N., 958
Carcioppo, J. T., 1067
Cardiomyopathy, 218
Cardiovascular disease, 218–219, 299, 837
See also Stroke
Cardozo, P. R., 789
Career counseling, 220, 224–225
See also Career development
Career development, 219–226
career counseling, 220, 224–225
current trends in, 225–226
needs of special groups and, 223–224
theories of, 220–223
Caregivers, aging parents as, 65–66, 590
Caretakers, psychology of, 327
Carey, J. R., 150
Carlton, M., 1115
Carrell, S. E., 1191
Carroll, J. B., 330, 331, 724, 725, 726
Carstensen, L., 1302
Cartesian Linguistics (Chomsky), 1289
Caruso, D., 459
Case study, 226–227, 797
See also Longitudinal research
Casey, B. J., 716
Caskie, G. I. L., 1128
Caspi, A., 366, 1256
Cataracts, 774
Categorical perception, 768
Categorization, 227–229
development of, 228–229
levels of, 227
summary on, 229
theories of, 228
Catholicism, 229–235
basic tenets of, 230–231
major practices of, 231–232
sacramentals of, 232–235
See also Religion
Caton, R., 453
Cattell, R. B., 279, 330, 528, 726, 1326
Cattell-Horn theory, 279, 330, 331
Cavanaugh, C., 382, 383
Ceci, S. J., 202
Center for Independent Living (CIL), 688
Centers for Disease Control and Prevention (CDC), 235–236, 487, 1296
Central nervous system (CNS), 186–187, 191, 325, 486
See also Brain development
Cerebral palsy (CP), 264–265, 361, 516, 803
Cervical cancer, 217
Chabris, C. F., 529
Chaiken, S., 141
Chambers, C. R., 693
Chaney, J. M., 1087
Chang, N., 1108
Chang-Rios, K., 911
Character education, 852
Character witness testimony, 316
Charter schools, 236–237
Chase, J. A., 89
CHAT (cultural historical activity theory), 16, 17, 19, 22
See also Activity theory
Cheek, J. M., 1171
Chemotherapy, 195, 216
Chen, D., 1183
Chen, Y., 52
Chess, S., 255, 905, 1255
Child abuse, 237–244
battered child syndrome (BCS) and, 159–160
consequences of, 241–242
courtroom testimony and, 317
definition of, 238
domestic violence and, 390–393, 810
historicial/cultural perspective, 237–238
incest and, 684
perpetrators, 241
prevention of, 243
summary on, 244
treatment for, 242–243
types of neglect and, 238–240, 249–251
victims of, 240
See also Battered woman syndrome (BWS)
Child abuse accommodation syndrome (CAAS), 240
Child Abuse Prevention and Treatment Act (CAPTA), 238
Child adoption, 35–38, 247
Child care/day care, 244–246
customs for, 327
future trends in, 246
history on, 245
quality, licensing, and regulations, 245–246
research on, 246, 1028–1029
sociopolitical strategies to, 245
See also Nursery (preschool)
Child custody, 246–249
divorce and, 339, 385–386
foster care and, 530–536
See also Divorce
Child maltreatment, 238, 888
See also Child abuse
Child molesters, 241
Child murder, 707–708
Child neglect, 249–251
abuse and, 239, 241
consequences of, 249–250
intervention efforts, 250
protective factors of, 250
risk factors of, 250
See also Child abuse

Child pornography, 239
Child protective service (CPS), 242
Child rearing, 251–257
  aggression and, 55–56
  attachment and, 126–133, 185, 251–252, 1192
  consequences of attachment, 253
  customs for, 327
  distinct parenting patterns and, 254–256
  insecure attachment patterns and, 252–253
  parenting advice, 256–257
  parenting styles and, 145–147, 162, 253, 378, 969–971, 984, 1027, 1193–1194
  spanking and, 311, 379, 1208–1209
  summary on, 257
  See also Parenting
Child settings, 327
Child sexual abuse. *See* Sexual abuse
Child Support Enforcement Program, 339
Childhood amnesia, 801, 823, 1025
Childhood and Society (Erikson), 667
Childhood cancer, 215, 264
Childhood disintegrative disorder (CDD), 986–987
Childhood obesity, 917, 919–920
Childhood-onset arthritis, 1086–1087
Childhood poverty. *See* Poverty
Childless by Choice, 258
Childlessness, 257–258
Childre, A., 830
Children, adoptive. *See* Adoption
Children with special health care needs (CSHCN), 258–259
  See also Individualized Education Programs (IEP)
Children's Bureau, 531
The Children's Corner, 1092
Children's rights, 259–260
Ching, L., 1261
Chlamydia, 1166
Cholesterol, 218
Chomsky, Noam (1928–), 766, 772, 1289–1291
  See also Language development
Choosing a Vocation (Parsons), 225
Chrisler, J. C., 1322
Christ, S. E., 716
Christopher, J. S., 335
Chromosomes, 262
Chronic fatigue syndrome (CFS), 262–263
Chronic illness, 264–266
Chronological age (CA), 266–267, 827, 1000
Churchill, J. D., 61, 64
Cicirelli, V. G., 1214
Cillessen, A. H. N., 977
Circadian rhythm, 267–268
  See also Biological clock
Circular reactions, 1034
Circumcision, 268–269
Civil Rights Act of 1964, 41, 87, 821, 1099
Civil Rights Act of 1991, 583
Clark, V. P., 135, 661, 1234
Classical conditioning, 269–270, 700
  See also Learning
Clay, M., 1323
Clayton, D. B., 324
Client-centered therapy, 1091
Clifton, R. K., 922
Clinical Treatment of the Problem Child, The (Rogers), 1091
Clinton, W., 327
Cluster suicide, 270–271
  See also Suicide
Coatsworth, J. D., 126
Cocaine, 271–274, 318, 397
  behavioral effects of, 273
  dependency, 273–274
  history of, 272
  pharmacology of, 272–273
  See also Drug abuse
Cochlear implant, 274–275, 342, 1145
  See also Deafness
Coelho, J. S., 100
Coffman, D., 799
Cognitive behavior therapy (CBT)
  for adult perpetrators, 1161
  for depression, 358
  for eating disorders, 100, 107, 435
  for generalized anxiety disorder (GAD), 570–571
  for memory failure, 501
  for phobias, 995
  for posttraumatic stress disorder (PTSD), 1013, 1159
  for social anxiety disorder (SAD), 1187
  for Tourette's syndrome, 1279
Cognitive development, 275–280, 1269–1270
  abstract reasoning and, 7–8
  accommodation and, 8–9, 281–282, 293
  adaptation and, 24
  in adulthood, 278–279
  assimilation and, 8, 24, 118–119, 281
  concrete operational period, 7, 291–292, 303, 347, 1117
  conservation and, 302–303
  contemporary issues in, 279–280
  deductive/inductive reasoning and, 347–349, 695–696
  in early childhood, 276–277, 421, 1023–1026, 1273
  egocentrism and, 441–442, 670, 1021
  equilibration and, 7, 293, 469–472
  five-to-seven shift, 526–527
  formal operational period, 7, 278, 529–530
  gender differences in, 561
  imaginary audience and, 670–671
  imaginary friend and, 671–672
  in infancy, 276, 698
  magical thinking and, 806–807
  in middle adulthood, 838–840
  in middle childhood/adolescence, 29, 31, 32, 34, 277–278, 1116–1119
  object permanence and, 921–922
  perspective taking and, 1037–1038
  preoperational thought, 1020–1022, 1024
  schema and, 1103–1104
  in young adulthood, 1336–1337
Cognitive differences, 691
Cognitive dissonance, 280–281

Cognitive equilibrium, 281–282
Cognitive-neoassociationism theory, 54
Cognitive style, 282–283
See also Locus of control
Cognitive theories of aging, 1262–1263
Cohabitation, 283–285
cohabitating couples, 283
culture and, 284
factors affecting trends, 283–284
relationship satisfaction, marriage, and divorce, 285, 1339–1340
summary on, 285
See also Common law marriage
Cohen, L. H., 1228
Cohen, L. M., 470, 472, 762, 1155
Cohn, J., 1185
Cohort study, 286, 797
See also Longitudinal research
Cole, M., 348
Coleman, H. L., 616
Coleman, J. C., 1222
Coleman, J. S., 1204
Colic, 287–288
Collateral sprouting, 191
Collection of the Most Important Military Techniques (Gongliang), 519
College, 1336–1337
See also Higher education
Collier, V., 1130
Combs, M. C., 1130
Common law marriage, 285, 288–289
See also Marriage
Communication. *See* Language development
Comorbidity, 289–290
antisocial behavior and, 103–105
high-risk infants and, 622
multiple disabilities and, 367
understanding, 1044, 1045
Competence *versus* performance, 290–291
Compton, S. N., 1206
Compulsory Education Law of 1889, 467
Conceptualization, 1168
Concrete operational period, 7, 291–292, 303, 347, 1117
See also Cognitive development
Condoms, 307
Conduct disorder (CD), 292–293, 350, 367, 368
Conflict, 293–299
conclusion on, 298
costs of, 296–297
intervention efforts, 297–298
nature of, 293–294
paradoxical influence of, 297
role in human development, 294–295
See also Aggression
Congenital adrenal hyperlasia (CAH), 560
Congenital anomalies, 174
Congenital rubella syndrome (CRS), 1093–1094
Congestive heart failure, 218, 299–300
Congregate housing, 300–301
Congregate Housing Services Program (CHSP), 301
Conrad, C., 629
Conroy, D. E., 126
Conscience, 301–302
See also Psychoanalytic theory
Consensual solidarity, 65
Conservation, 302–303
See also Cognitive development
Content analysis, 1059
Continuity and discontinuity, in development, 303–306, 1265
See also Development
Contraception, 306–308
gender, negotiation, and relationships, 307–308
major methods of, 306–307
new methods of, 307
Control group. *See* Experimental group
Controlled Substance Act of 1970, 91, 272
Conventional reasoning, 855
Convergent thinking, 308–309, 320
Conway, F., 591
Coogler, O. J., 389
Cooke, D. T., 486, 662, 876
Coolidge, F. L., 1073, 1298
Cooperative learning, 309–310
See also Learning
Cooperative play, 310–311
Coparenting, 248
Copycat suicide, 271
Corbin, W. R., 172
Coronary heart disease, 218
Corporal punishment, 311–313, 379, 1208
See also Punishment
Corr, C. A., 403
Correlation, 313–314
Corwyn, R. F., 1206
Cosleeping arrangements, 314–315
Costello, E. J., 1206
Counseling and Psychotherapy: Newer Concepts in Practice (Rogers), 1091
Counseling therapy, 108
Court Appointed Special Advocate (CASA), 534
Courtroom testimony, 315–318
Coussons-Read, M., 706
Cox, D. W., 157, 1136
Coyle, T. R., 1319
Crack baby syndrome, 274, 318–319
Crago, M., 773
Crain, T., 103, 154
Crawling, 319–320
See also Infancy
Creativity, 320–322, 1132
Creutzfeldt-Jakob disease (CJD), 322–323, 354
Crib speech, 1036
Crick, N., 559
Criterion-referenced tests, 323–324, 1100
Critical period, 324–326, 1142
See also Development
Crompton, R., 401
Cronbach, L. J., 724, 725, 1073

Cross, W. E., 479
Cross-cultural development, 326–329
  application to minority groups, 328
  culture and ethnicity, 326–327
  domains of study in, 328
  human development and, 327
  summary on, 328–329
  systems in the study of, 327
  See also Longitudinal research
Cross-race identification, 317
Cross-sectional research, 329
  See also Longitudinal research
Crowther, J. H., 173, 211
Cruzan, N., 38, 1088, 1089
Cruzan v. Director, Missouri Department of Health (1990), 1088
Crying, 329–330, 768
  See also Infancy
Crystallized intelligence, 279, 330–331, 838, 1326
  See also Intelligence
Cuban Americans, 634–635
  See also Hispanic Americans
Cultural historical activity theory (CHAT), 16, 17, 19, 22
  See also Activity theory
Cummins, J., 1129, 1130
Curry, T. E., Jr., 948
Cusack, R., 59
Custody. *See* Child custody; Joint custody
Cystic fibrosis (CF), 265, 331–332

Da Vinci, L., 333
Danso, H. A., 678
Darcy, M. U. A., 643
Darwin, Charles (1809–1882), 333–334, 380, 697
Das, J. P., 725
Dasch, K., 1228
Dating, 334–338
  in adolescence, 982–983, 1196
  importance for socialization, 335–336
  interracial and intercultural, 336–337
  nature of, 334–335
  parental and cultural prohibitions, 336
  potential risk in relationships, 338
  sexuality and, 337, 458
Davey, A., 728
Dawkins, R., 411
Day, K. M., 84
Day care/child care. *See* Child care/day care
DDT (dichlorodiphenyltichloroethane), 989–990
Deadbeat dads, 338–341
  See also Divorce
Deafness, 341–343
  American Sign Language (ASL), 86–87, 153, 342, 772
  atypical sensory development and, 1145
  auditory amplification, 342
  birth defects and, 175
  cochlear implants, 274–275, 1145
  diagnosis of, 341, 361
  early intervention programs, 341
  educating deaf children, 342
  language and communication, 342, 772
  perspectives on, 343
  socialization aspects of, 342–343
Dearing, E., 1016
Deater-Deckard, K., 1220
Death, 343–346, 1212
  advance directives and, 38–39
  bereavement and, 163–166
  developmental aspects of, 344–345
  dying and, 403–409
  euthanasia and, 480–485
  expressions of grief, 345
  funerals, 546–547
  hospice care and, 406, 649–655
  infant mortality and, 702–707
  palliative care and, 953–955
  psychological aspects of, 196
  right-to-die movement, 346, 1088–1090
  widowhood and widowerhood, 1324–1325
  See also Stages of dying
Death with dignity, 346–347, 1088
  See also Dying
Death with Dignity Act, 121, 346, 482
Deaux, K., 561
DeCasper, A. J., 511, 700, 767
Declarative memory, 349, 800, 801
Deductive reasoning, 347–349, 695
  See also Cognitive development
Defense mechanisms, 1045
Deferred imitation, 349–350, 674
Defining-attribute theory, 228
DeJong, G., 689
Delaney, P. F., 374
Delinquency, 350–353
  comorbid disorders and causes, 350–351
  conclusions on, 353
  definitions and descriptions of, 350
  empirically supported interventions, 351–352
  later consequences of, 352
  onset, prevalence, and course, 350
DellaVecchia, F., 809
Delwiche, J. F., 1249
Dementia, 353–355
  Alzheimer's disease (AD) and, 79–81, 135, 354, 395, 775, 800, 934
  assessment of, 354–355
  characteristics of, 354
  definition of, 353
  differential diagnosis of, 353
  in later adulthood, 774–775, 1301
  prevalence of, 354, 575
  subtypes of, 354
  treatment of, 355
Dempsey, J. P., 448
Dependent variable, 355–356, 490, 491
  See also Experiment
Depression, 356–359
  in later adulthood, 775
  in oldest old age, 934

postpartum depression, 815, 1010–1012
theories of etiology, 357–358
treatment of, 358–359, 1046
See also Psychopathology
DeRuyck, K. A., 912
Descartes, R., 1289
Descent of Man, and Selection in Relation to Sex (Darwin), 333
DeToma, H. R., 619
Development, 359–360
continuity and discontinuity in, 303–306, 1265
critical period in, 324–326, 1142
sensitive period in, 1142–1143
See also Theories of development
Development theories of aging, 1263–1264
Developmental coordination disorder (DCD), 516
Developmental direction, 360
See also Maturation
Developmental disabilities, 360–363
definition of, 361
diagnoses of, 361–362, 1039
high-risk infants and, 623–624
summary on, 362–363
See also Pervasive developmental disorders (PDDs)
Developmental psychopathology, 363–369
aspects of, 363–364
history of, 364
implications of, 369
key issues in, 364–369
See also Psychopathology
Developmental Psychopathology (Achenbach), 364
Developmental quotient (DQ), 369–370
Developmental screening tests, 758
DeVos, J., 922
Diabetes, 265, 370–372, 1230, 1246
Diagnostic and Statistical Manual for Mental Disorders (*DSM*), 364, 365, 372–373, 1044
Dialectical thought, 373–374, 1336
Diamond, J., 413
Diamond Sutra, The (Soeng), 207
Diaphragm, 307
Diathesis-stress model, 365–366, 1045
Dick, A. C., 686
Diderot, D., 1289
Dieting, 374–377, 920, 1006
See also Weight
Differential Aptitude Test (DAT), 114
Difficult temperament, 366
See also Temperament
DiGeorge syndrome, 1245–1246
Dignified death. *See* Death with dignity
Dimensional theory, 142
See also Attribution theory
Disasters, 377–378
Discipline, 56, 378–380
clinical implications of, 380
cross-cultural issues in, 379
effective home discipline, 378, 971–972
effective school discipline, 378–379
ethics of punishment, 784–785
legal issues regarding physical punishment, 379–380
outcomes of ineffective, 380
spanking and, 311, 1208–1209
types of, 378
See also Punishment
Discontinuity in development. *See* Continuity and discontinuity, in development
Discourse analysis, 1059
Discourse on the Arts and Sciences (Rousseau), 909
Disengagement theory, 1265
Disgust, 380–382
See also Phobias
Dishabituation. *See* Habituation
Disinhibition, 1141
Disorganized attachment, 252
Dissonance, cognitive, 280–281
Distance learning, 382–383
Ditto, P. H., 39
Divergent thinking, 308, 320, 321, 867
Divorce, 383–389
cohabitation and, 283, 285
custody and, 246–249, 339, 385–386
deadbeat dads and, 338–341
emotional stages of, 386–387
helping children cope with, 387–389
history of, 383–384
joint custody and, 745–747
mediation, 385, 389–390
remarriage and, 1340
single parents and, 1176–1177
stepfamilies and, 1219–1221
typical chronology, 384–385
See also Marriage
Divorce mediation, 385, 389–390
See also Deadbeat dads
DNR (do-not-resuscitate), 39
Do-not-resuscitate (DNR), 39
Dodge, K., 1307
Dole, V., 834
Domestic violence, 390–393, 810
See also Child abuse; Elder abuse
Donald, I., 1287
Donalek, J., 263
Donohue, B., 353
Donor insemination (DI), 393–394
Don't Push Your Preschooler (Ames), 89
Dooley, H., 338
Dormire, S. L., 656
Down, J. L., 394
Down syndrome, 394–396
aging and, 395
developmental aspects of, 152–153, 361, 394–395
interventions and community living, 395–396
physical and medical aspects of, 394
See also Mental retardation
Dreaming, 1181
Dreyer, M. L., 217
Drive theory, 858

Driving while intoxicated (DWI), 806
See also Drunk driving
Dropik, P. L., 349
Drug abuse, 396–399
cocaine and, 271–274, 318, 397
definition of, 396–397
drug education on, 398
fetus development and, 512
future implications on, 399
marijuana and, 808–809
monetary costs of, 397
moral and attitudinal issues, 397–398
Native Americans and, 887
policies on illegal drugs, 398
prescription drugs and, 397
production and distribution of, 397
rates of use and, 397
treatment strategies, 398–399
Drug Abuse Resistance Education (D.A.R.E.), 398
Drunk driving, 399–400, 805
Dryden, J., 909
DTP vaccine, 680
Dual-earner households, 400–403
See also Marriage
Dualism, 1336
Dubkin-Lee, S., 762, 1155
Ducenne, L., 438
Dukes, R. L., 399
Dumaret, A. C., 1206
DuMarsais, C. C., 1289
Dumphy, D., 1195
Duncan, G. J., 1205, 1206, 1207
Dunn, J., 1220
Duran, A., 556
Durkheim, E, 301
Dussik, K. T., 1287
Duyme, M., 1206
Dweck, C. S., 779, 1120
DWI (driving while intoxicated), 806
See also Drunk driving
Dyer, J. L., 846
Dying, 403–409
cultural factors in, 406–409
hospice care, 406, 649–655
individuality in, 1214
physical factors in, 404
psychological/emotional factors in, 196, 404–405
religious and spiritual factors in, 405–406
social factors in, 405
summary on, 409
theories/models of, 403–404, 762, 1213–1214
See also Death
Dynamical systems, 409–416
dynamics of, 411–412
evolution of the human kind, 412–416
theory of, 409–411
Dyslexia, 416–418, 998, 1066
See also Learning disabilities
Dysthymic disorder (DD), 356, 847
Eagly, A. H., 141, 561, 563, 858
Early childhood, 419–425
acquisition of gross/fine motor skills, 420, 593
advances in cognition, 421–423
brain development in, 419–420
changes in language skills, 420–421
emotional development in, 456–457
formation of social relationships and emotions, 423–425
friendship and, 541
parent-child relationships, 962
peer interaction in, 978–979
physical growth and development in, 1003, 1023
summary on, 425
Early Intervention Collaborative Study (EICS), 428
Early intervention programs, 425–431
Abecedarian Research Project, 1–4, 428
conclusion on, 429–430
costs of, 429
current research models, 429
deafness and, 341
dyslexia and, 417
enhancing child development, 426–427
Head Start, 429, 604–610, 896, 1016
importance of family support, 427
lasting benefits to society, 427–428
Montessori schools, 844–847
nursery (preschool) programs, 913–916
Perry Preschool Project, 428–429, 608, 985
research programs, 428–429
types of, 426
Early Training Project, 428
Eating disorders, 431–437
anorexia nervosa, 98–101, 173, 431–432, 1321
binge eating, 172–173, 210, 375
bulimia nervosa, 173, 210–211, 432, 436
definition and identification, 431–432
health consequences of, 433, 1006
prevalence of, 432–433
summary on, 437
treatment methods for, 99–100, 435–437
underlying causes of, 433–435
See also Dieting
Ebonics, 45
Echoic memory, 799
Echolalia, 437–438
Ecological theory, 201, 438–440
Ecology of Human Development (Bronfenbrenner), 201
Ecosystems. *See* Dynamical systems
ED (erectile dysfunction), 472
Education for All Handicapped Children Act of 1975, 425, 694, 787, 804
Educational neglect, 239, 249
See also Child neglect
Edwards, K. M., 612
Edwards, L. M., 479
EEG (electroencephalogram), 452–453, 1180, 1233
See also Brain development
Egan, S. K., 564, 565, 567
Egeland, B., 130, 249

Ego, 440–441, 442, 665
See also Psychoanalytic theory
Ego development, 442–443
Egocentrism, 441–442, 670, 1021
See also Cognitive development
Ehrhardt, A., 566
Einstein, A., 1057
Eisenberg, N., 852
Ejective consciousness, 461
Elaboration, 321
Elbeshbeshy, H. A., 1312
Elder abuse, 443–444, 447
Elder maltreatment, 443, 444–446, 448
Elder neglect, 446–449
Elderhostel programs, 449–450
See also Middle adulthood
Electra and Oedipal complexes, 450–452, 567, 1042
Electroconvulsive therapy (ECT), 358
Electroencephalogram (EEG), 452–453, 1180, 1233
See also Brain development
Elementary and Secondary Education Act (ESEA), 467
Eliot, C. W., 1063
Elkind, D., 530
Elliott, M. R., 287, 1071
Ellis, T. E., 1240
Else-Quest, N. M., 1018
Emancipation, 33
See also Adolescence
Embryo, 453–454, 508, 1001
See also Pregnancy
Emergency contraception (EC), 307
Emerging adulthood, 454–456
context and, 455–456
definition of, 454
features of, 454–455
social changes leading to, 454
summary on, 456
Emery, C. F., 489
Emotional abuse, 444
See also Emotional neglect
Emotional development, 456–458
in adolescence, 457–458
altruism and, 76–79, 461–462, 1049
in early childhood, 456–457, 1273–1274
empathy and, 461–463, 1038, 1149
gender differences in, 559
in infancy, 456
intimacy and, 733–734
in middle and late childhood, 457
during the school years, 1119–1121
in young adulthood, 1337–1338
Emotional disorders, 361–362
Emotional intelligence, 458–460
See also Intelligence
Emotional Intelligence: Why It Can Matter More Than IQ (Goleman), 458
Emotional neglect, 239, 249
See also Child neglect; Elder neglect
Empathy, 460–463, 1038
altruism, moral development and, 461–462, 851–852, 1049
definition of, 460–461
differences in, 462, 1149
See also Emotional development
Empty nest, 463–464
End-of-life care, 38–39, 346, 954
See also Death
End-of-Life Choices, 346, 1088
End-stage renal disease (ESRD), 821
Endocrine disruptors, 464–465
Engels, F., 16
Engeström, Y., 16
Engheta, C. D. M., 880, 881
English as a Second Language (ESL), 465–468
historical background, 466–467
methods of teaching, 467–468
types of programs, 466
See also Language development
Ensminger, M. E., 1206
Entwisle, D. R., 1205
Epidemiology Program Office (EPO), 236
Epilepsy, 362, 468–469
Episodic memory, 800
Epstein, L. H., 920, 921
Equal Employment Opportunity Commission (EEOC), 50, 88
Equilibration, 469–472
reflective abstraction and, 7, 293, 471–472
stage growth and, 470–471
types of, 470
See also Cognitive development
Equine-assisted therapy, 990
Erb's palsy, 179
Ercal, N., 777
Erectile dysfunction (ED), 472
Erickson, M. F., 249
Erikson, Erik (1902–1994), 473
ego and, 440, 442
identity development and, 667–668
intrapersonal conflict and, 293
psychosocial development and, 304, 840, 962, 1047–1049, 1273
See also Psychosocial development
Escoto, C., 659
ESL (English as a Second Language), 465–468
See also Language development
Espinoza, L., 1344
Estes, D., 833
Estrogen, 473–474, 645
See also Hormones
Etaugh, C., 94
Ethical standards, of research, 474–476
See also Experiment
Ethnic cleansing, 476–478, 636
Ethnic identity, 478–479
Ethnicity, 326–327
Ethology, 479–480
Euthanasia, 346, 480–485, 1088
arguments for and against, 485
conclusion on, 485

cultural issues related to, 482–483
historical discourse about, 481–482
international perspectives on, 483–484
terms and definitions of, 121, 481
See also Death
Evolutionary psychology, 858
Excitation transfer theory of arousal, 54
Executive function, 134, 486–487
Exercise, 487–489
age specific benefits, 487–488
current recommendations for, 487
demographics for, 487
general benefits of, 488–489
prenatal care and, 515
summary on, 489
Exogenous attention, 133–134
Experience, impact of, 895–896
Experience seeking, 1141
Experiment, 355, 489–490, 1125
See also Scientific method
Experimental design, 1125–1126
Experimental group, 490–491
Experimental method, 491–492
Experimental Psychology of the Thought Processes (Lipps), 460
Expert witness testimony, 316
Explanation-based categorization, 228, 229
Explicit memory, 349, 800
Exploitation, child. *See* Child abuse
Exploitation, sexual, 239–240, 241
Exposure with response prevention (ERP), 925–926
Expressive language, 29
See also Language development
Extended family, 492–495
See also Family size
Externalizing behavior, 103
Extinction, 495–496, 783–784
See also Operant conditioning
Extramarital sex, 496–497
See also Marriage
Extrapair copulation (EPC), 497
Eyberg, S. M., 964
Eyewitness testimony, 316, 317, 502–503
See also Memory failure

Factitious disorder, 239
Fagot, B., 561
Failure to thrive, 499–501, 1320
Fairburn, C. G., 173
False memories, 501–504
Falwell, K. D., 790
Families and Child Experiences Survey (FACES), 606
Family child care. *See* Child care/day care
Family dynamics, 505
Family foster care, 532
See also Foster care
Family functional therapy (FFT), 352
Family size, 493, 504–505
Family structure, 505
Fantz, R., 699
Farach, F. J., 290
Farrar, M. J., 1029
Farrehi, A., 1228
Farzin, F., 537
Fatherhood. *See* Fathers
Fatherhood Project, 340
Fathers, 505–507, 1177–1178
Feder, M., 311
Federal Glass Ceiling Act of 1991, 582
Federal Insurance Contributions Act (FICA), 1198
Federal Patient Self Determination Act of 1991, 1213
Federal Welfare Reform Act of 1996, 339
Feeding Behavior of Infants (Ilg & Gesell), 669
Feeney, D. M., 1232
Feiler, A., 370
Fein, D. A., 989
Feminine morality theory. *See* Gilligan, Carol (1936–)
Femininity, 92, 615, 780
Fernandez, E. C., 153
Ferraro, F. R., 576
Ferrucci, L., 157
Fetal alcohol syndrome (FAS), 512, 1257
Fetal medicine, 507–508
Fetal period. *See* Fetus
Fetus, 508–515, 903
changes during prenatal development, 509–511
expectant mothers experience, 511
maternal smoking and, 818
prenatal care, 514–515
stages of prenatal development, 508–509, 1001
summary on, 515
threats to fetus and maternal health, 511–514
See also Pregnancy
Fiduciary Abuse Specialist Team (FAST), 446
Field, T., 699
Fifer, W., 700, 767
Final Exit: The Practicalities of Self-Deliverance and Assisted Suicide (Humphry), 1088
Fincher, C., 1102
Fine motor control, 515–516
See also Fine motor development
Fine motor development, 517–519
aging and, 518–519
mechanisms of, 517
stages of, 28, 31, 32, 420, 517–518
See also Gross motor development
Finkelhor, D., 1161
Finley, G. E., 747
Firearms, 519–525
gun development, 520–523
handgun control, 523–524
historical background on, 519–520
See also Injuries
Fireman, G. D., 250, 448
Fireman, S. M., 448
First Language, A, (Brown), 202
Firstborn children, 177, 504
Fishbein, M., 913
Fisher, E. R., 161

Fitch, R. H., 648
Fitzberald, D. L., 1072
Five-factor model (FFM), of personality, 525–526
Five-to-seven shift, 526–527
See also Cognitive development
Fivush, R., 559
Flanagan, D. P., 331
Flavell, E. R., 528
Flavell, John (1928–), 527–528, 833, 1118
Flexibility, 320–321
Fluency, 320
Fluid intelligence, 330, 331, 528–529, 1326
See also Intelligence
Folkman, J., 1261
Folley, B., 189
Fondow, M. D. M., 489
Food allergens, 75–76
See also Allergy
Foodborne transmission, 710
Footling breech, 200
For Better or Worse: Divorce Reconsidered (Hetherington), 617
Forbes, S. A., 443
Ford, A. I., 286, 604, 645
Forehand, R., 964
Forgatch, M., 964
Formal operational period, 7, 278, 529–530
See also Cognitive development
Foster care, 530–536
characteristics of foster parents, 534–535
effectiveness of, 535–536
entry into, 533
exiting, 534
foster parent selection, 534
outcomes of, 533
role of foster parents, 535
social/political trends in, 531–532
types of, 532–533
See also Child custody
Foster parents. *See* Foster care
Fothergill, K., 1206
Fountain, N. B., 469
Fourteenth Amendment, 5
Fowers, B., 383
Fox, J. E., 8, 118
Fox, M. A., 372
Fragile X syndrome, 536–537
Frames of Mind (Gardner), 552
Framingham Heart Study, 537–538
France, A., 1287
Franiuk, R., 285
Fraternal twins, 538–539
See also Twins
Freud, A., 305, 440, 441
Freud, Sigmund (1856–1939), 272, 539–540, 1268
conscience and, 301
ego and, 440–441, 442, 665
Electra and Oedipal complexes, 450–452, 567, 1042
infancy and, 697
intrapersonal conflict and, 293
libidinal drive and, 1041
magical thinking and, 806–807
moral development and, 851
religion and, 1075
superego and, 1240
See also Psychoanalytic theory
Frey, T., 1094
Frick, K. M., 474
Frick, P. J., 293
Friedman, E. A., 766
Friedman, L., 1152
Friendship, 540–546
aggression and, 56
conclusion on, 546
definitions of, 540–541
formation, maintenance, and dissolution of, 543–544
gender differences in, 546, 1195
socioemotional adjustment and, 545
stages of, 541–543, 1338–1339
See also Peers
Froebel, F., 914
Frondizi, R., 441
Frost, R., 151
Frustration-aggression theory, 54
See also Aggression
Frustration and Aggression (Sears), 1126
Fukumizu, M., 904
Fulghum, R., 757
Fuller, D. K., 389
Functional solidarity, 65
Funerals, 546–547
See also Death
Furman, W., 546

Galanter, E., 724
Gallaudet, T. H., 86
Gallo, R., 13
Galton, F., 724, 864
Gamete, 549–550
See also Pregnancy
Gane, L., 537
Gang Resistance Education and Training Program (GREAT), 551
Gangs, 550–552
Gantt, E. E., 462
Gardner, Howard (1943–), 552–553, 725, 736, 865
See also Multiple intelligences
Gardner, J., 822, 1098
Gardner, R., 248
Garmezy, N., 364
Garrity, C., 386
Gass, M. P., 539, 666, 863
Gateway drug, 553–554
See also Addiction
Gautama, S., 203, 204
Gay marriages, 554–557
conclusion on, 556
frequency of, 555
history of same-sex unions, 555, 811

legal and political issues of, 556
social issues of, 555–556
See also Homosexuality
Geetter, J., 24
Gelman, R., 277
Gender. *See* Gender differences
Gender constancy, 1027
Gender differences, 557–563
in early childhood, 423–424
in friendship, 546, 1195
in males and females, 557–560
in mortality, 856–857
in oldest old age, 932
in retirement adjustment, 1082
social and political implications of, 562–563
in social development, 1196–1197
socializing agents of, 562, 1038–1039
summary on, 563
theories of development and, 560–562, 851
See also Sex differences
Gender identity, 563–566, 788
See also Gender role development
Gender role development, 566–568
See also Identity
Gender schema theory, 561–562, 567
General aggression model (GAM), 55
See also Aggression
General Aptitude Test Battery (GATB), 114
General fluid intelligence (Gf). *See* Fluid intelligence
Generalizability, 568–569
See also Experimental method
Generalized anxiety disorder (GAD), 569–571, 1046
See also Anxiety disorders
Generation gap, 571–572
Genes, products of, 894–895
Genetic diseases, 262
Genital warts, 1166
Genocide, 478, 636
Genotype, 572–573
See also Phenotype
Gentile, D. A., 1306
German measles (rubella), 1093–1094
See also Teratogen
Gerontological Society of America (GSA), 573–574
Gerontology, 574–576
Gershoff, E. T., 1209
Gesell, Arnold (1880–1961), 576–577, 669, 697, 1266, 1282
See also Maturation
Gestational age, 620, 801
Gestational surrogate, 1241
Gesture imitation, 673
Get Skinnier on Fabulous Food (Somer), 376
Gfroerer, K., 178
Gibson, E., 701
Gibson, E. J., 228, 1309
Gibson, J. J., 701
Gifted Group in Later Maturity, The (Sears), 1127
Giftedness, 577–579, 866
Gilbert, R., 1280
Gilligan, Carol (1936–), 579–580
criticisms of theory, 582
evidence for theory, 581–582
theory of moral development, 580–581, 851
See also Moral development
Gilligan's theory of feminine morality, 580–582
See also Gilligan, Carol (1936–)
Gilstap, L. L., 202, 317, 1104
Gislanson, K., 629
Glaser, B. G., 404, 405, 1213
Glaser, R., 323, 724
Glass ceiling, 582–583
Glaucoma, 774
Gleason, T. R., 671
Glenn, S. J. M., 3, 246, 430
Global amnesia, 800
See also Amnesia
Global Polio Eradiction Initiative, 680
Glover, J. A., 321
Gluck, J. P., 476
Goel, V., 347
Going to School: How to Help Your Child Succeed (Ramey), 3
Goldberg, E., 486
Goldfield, E. C., 595
Golding, J., 1220
Goleman, D., 458, 459
Golinkoff, R., 768
Gondolf, E. W., 161
Gongliang, Z., 519
Gonorrhea, 1166
Goodman, K., 1323
Gopnik, M., 773
Gordon, L. M., 144, 418, 553, 998, 1324
Gore-Laird, H. M., 441
Gosell, A., 360, 819
Gottlieb, G., 304, 324
Gottman, J., 971
Goubet, N., 922
Gould, S. J., 737
Grade retention, 583–586, 1077
effectiveness of, 584–585
student characteristics, 584
student's perspectives on, 585–586
summary on, 586
See also School
Graduate education, 672
Graduate Record Exam (GRE), 1100
Graduated driver license (GDL), 721
Graham, S., 144
Grandparents, 586–591, 928
developmental perspective on, 589
grandparent-grandchild relationship, 587–588
intergenerational relationships and, 727–728
role of grandparenting, 587
role of societal changes and, 589
surrogate parenting by, 589–591
Gray, J. R., 529
Gray, S., 428
Gray Panthers, 591–592

Green, C. E., 350
Green, F. L., 528
Green, J. A., 1060
Greene, E., 317
Greenfield, P., 328
Greenough, W. T., 61, 190
Gregg, N. M., 1093
Grice, J. W., 526
Grief. *See* Bereavement
Grief and mourning, 163–166
Grigorenko, E., 867
Grosjean, F., 1130
Gross motor control, 516
Gross motor development, 592–596
  actions on objects, 594–595
  basic orienting, 593
  locomotion, 593–594
Grossman, A. W., 61
Grotevant, H., 37
Grotpeter, J., 559
Grounded theory, 1059
Group foster care, 533
Group homes, 533
Growth curve, 1001–1002
Guerrero, B. M., 166, 409
Guilford, J. P., 308, 320, 528, 724, 864, 866
Guill, A. B., 955
Gun development, 520–523
  See also Firearms
Güss, C. D., 348, 601, 1327

HAART (highly active antiretroviral treatment), 11, 14, 658
Haberlandt, K., 1066
Habituation, 597–600
  in human development and learning, 598–599, 1068
  in infancy, 598, 699
  occurrence of, 599
  properties of, 597–598
  summary on, 599
  See also Learning
Hackett, G., 222
Haddon, W., 716
Hagen, J. W., 1201
Hagerman, R. J., 537
Haith, M. M., 700
Halfon, N., 264
Hall, G. Stanley (1844–1924), 600–601, 1221, 1267
Hallucal dorsiflexion reflex, 153
Hallucinations, 1105
Halsted, W. S., 272
Halverson, C., 567
Hamilton, W., 77
Handbook of Child Psychology (Rutter & Garmezy), 364
Handgun control, 523–524
  See also Firearms
Haney, M. R., 114
Hanf, C., 964
Hanley, G. P., 112, 322, 569, 1126
Hannon, B. A. M., 1010
Hansen, D. J., 335
Hanson, T., 1219, 1220
Harber, C. C., 89
Hare-Mutin, R., 563
Harkness, S., 327
Harlow, H., 813
Harlow, Harry (1905–1981), 601
Harper, J. M., 936, 939
Harrington, E. F., 173
Harris, J. R., 978
Harris, L. J., 163, 280
Harris, P. L., 672
Harris, Z., 1289, 1290
Harris, Z. S., 261
Harrision Narcotic Act, 272
Hartley, S. L., 396
Hartman, S., 1077
Hartmann, H., 440, 442
Hatcher, R., 306
Hate crimes, 602–604
  causes of, 603
  perpetrators of, 602–603
  prevalence rates of, 602
  prevention efforts of, 603–604
  summary on, 604
Hatzair, H., 757
Hawkins, B. A., 68, 592
Hayes, M. J., 904
Hays-Thomas, R., 583
Hayslip, B., Jr., 655
He Hit Me First (Ames), 89
Head Start, 604–610, 896
  evaluation outcomes of, 607–608
  future directions of, 609–610
  history of, 604–606
  program extensions of, 429, 606–607
  social and policy implications of, 608–609, 1016
  See also Early intervention programs
Health insurance, 610–612
  See also Medicare
Health maintenance organizations (HMOs), 611, 822
Healthism, 50
Healthy People 2010, 1033
Healthy Start, 706
Hearing impairments, 274, 341, 361, 1145
  See also Deafness
Heart failure, 299–300
Hebb, D. O., 190, 325, 331
Heft, H., 159
Heggenhougen, H. K., 945
Helms, J. E., 479
Hemlock Society, 346
Hemophilia, 612–613
Henderson, H. A., 1039
Henderson, L., 171, 331
Henkel, L. A., 503
Henri, V., 724
Hepatitis, 680, 710, 1166, 1296
Heritability. *See* Nature-nurture

Herman, G., 508
Hernandez, D. V., 124
Herpes virus, 1166
Herrera, E. A., 1275
Herrmann, D., 823
Hertenstein, M. J., 133, 601, 1008, 1146, 1224, 1225, 1277
Hesse, E., 1224
Heterosexuality, 613–617
  attraction, 614
  behavior, 614–615
  identity, 615–616
  See also Homosexuality
Hetherington, E. Mavis (1926–), 617
  See also Divorce mediation
High, E. C., 890
High blood pressure (hypertension), 218, 219, 617–620, 1230, 1232
High-risk infants, 620–626
  assessment of, 621–622
  definitions, factors, and incidence of, 620–621, 666
  family issues, 624–625
  low birth weight (LBW), 801–804
  physical components of, 622–624
  preterm births, 1029–1031
  strategies to decrease risk, 625–626
  very low birth weight (VLBW), 602, 666, 863, 1298–1301
  See also Pregnancy
High/Scope Perry Preschool Project. *See* Perry Preschool Project
Higher education, 626–629, 1098, 1336–1337
Highly active antiretroviral treatment (HAART), 11, 14, 658
Hilberg, R., 103
Hilden, J. M., 953
Hill, H. H., 353
Hillhouse, M., 92
Himelein, M., 712
Himelstein, B. P., 953
Himle, M. B., 943
Hinde, R., 480
Hines, D. A., 446
Hines, M., 560
Hinton, J., 1178
Hippotherapy, 990
Hiroto, D. S., 778
Hirsch-Pasek, K., 768
Hirsh, D., 478
Hispanic Americans, 629–635
  challenges for, 630–631
  cultural factors in dying and, 407, 483
  current trends of, 635
  diversity and similarities of, 631
  quinceañera and, 1062
  subgroups of, 632–635
Historically black colleges and universities (UBCUs), 627
Hitch, G. J., 1168
HIV. *See* Human immunodeficiency virus (HIV)
HMOs (health maintenance organizations), 611
Hodgkin's disease, 216
Hohmann, L., 546
Holahan, C. K., 1127
Holden, G., 210
Holland, J., 167
Holland, J. L., 221, 225, 691
Hollingshead, A. B., 1204
Hollingworth, L., 864
Holmes, C. S., 372
Holmes, R., 1225
Holmes-Lonergan, H. A., 983
Holocaust, 635–637, 753
  See also Judaism
Holstein, C. S., 580
Holzinger, K. J., 726
Home birth, 637–639
Home discipline. *See* Discipline
Homicide, 639–641, 707
Homosexuality, 641–643, 789
  adolescents and, 983
  bisexuality and, 180–183
  criticisms of categorical models, 642–643
  gay marriages and, 554–557, 811
  gender identity and, 563–566, 788
  heterosexuality and, 613–617
  historical context of, 642
  identity development models, 642
Hoopes, M. H., 936
Hope, 643–645
Hormonal contraception, 307
Hormone-replacement therapy (HRT), 645–646, 648
  See also Menopause
Hormones, 646–649
  in adulthood, 647
  aging and, 648
  cognition and, 647–648
  manipulations of, 648
  sexual differentiation and, 646–647
  summary on, 648
Horn, J. L., 279, 330, 528, 725, 726
Horney, K., 440, 442
Hospice, 406, 649–655
  burnout and attrition in, 652–653
  a final word, 654–655
  grief and bereavement in, 654
  health care delivery in, 650–651
  history and origins of, 650
  interdisciplinary team in, 651–652
  legal and ethical aspects of, 651
  patient-family dynamics in, 653–654
  See also Death
Host pathogens, 709
Hot flashes, 655–656
  See also Menopause
Hotaling, G. T., 334
Houlihan, D., 790
Housing and Community Development Act, 300–301
Howes, C., 978
Huberty, T. J., 108
Huffine, C., 168
Hufnagel, P. P., 1078
Hull, C., 114, 858

Human development policy, 1054
Human Genome Project (HGP), 44, 656–658
Human immunodeficiency virus (HIV), 264, 658–659
  diagnosis of, 10
  global impact of, 14
  immune system functioning and, 9–10, 678–679
  medical intervention efforts, 10–11
  prevention of, 12–13
  sexual activity and, 337, 1164, 1165
  T cells and, 1246
  transmission of, 11–12, 1020, 1166
  See also Acquired immune deficiency syndrome (AIDS)
Human mind, evolution of the, 412–416
  See also Dynamical systems
Human papillomavirus (HPV), 1166
Human research, ethical principles of, 475–476
Humor, 659–660
Humphry, D., 1088
Hunter, H. L., 184
Huntington's chorea. *See* Huntington's disease
Huntington's disease, 135, 354, 660–661
Hurst, D. R., 708
Husenits, K. J., 257
Huttenlocher, P. R., 326
Hyde, J. S., 557, 558, 939, 1018
Hydrocephalus, 661–662
Hymes, D., 290
Hyperactivity-impulsivity-inattention (HIA), 103
  See also Attention
Hypertension. *See* High blood pressure (hypertension)
Hypoglycemia, 371
Hypothesis, 662–663, 1218
  See also Scientific method

IADLs (instrumental activities of daily living), 15, 935
  See also ADLs (activities of daily living)
Iconic memory, 799
Id, 665–666
  See also Psychoanalytic theory
IDEA (Individuals with Disabilities Education Act), 425, 685, 694–695, 786, 787
  See also Individualized Education Programs (IEP)
Identical twins, 666–667
Identification and Child Rearing (Sears), 1127
Identity, 458, 667–669
  emerging adulthood and, 455
  Erikson's theory of, 667–668
  ethnic identity, 478–479
  gender identity, 563–566, 788
  heterosexual, 615–616
  homosexuality and, 641–643
  recent developments of, 668–669
  in young adulthood, 1338
  See also Homosexuality
IEP (Individualized Education Programs). *See* Individualized Education Programs (IEP)
Ilg, Frances (1902–1981), 669–670, 1267
Illegal drugs, 398
  See also Drug abuse
Imaginary audience, 670–671
  See also Cognitive development
Imaginary friend, 671–672
Imaginary thinking, 672–673
Imitation, 673–675
Imitation suicide, 271
Immigrants, 675–678
Immune system, 9, 678–679
  See also Acquired immune deficiency syndrome (AIDS)
Immunizations, 116, 148, 679–681, 1052, 1093, 1322
Implicit memory, 800
Impotence, 472
Imprinting, 681–682
In a Different Voice: Psychological Theory and Women's Development (Gilligan), 580
In vitro fertilization (IVF), 711
Inattention. *See* Attention
Inborn errors, 174
Inborn errors of metabolism (IEMs), 682–684
Incest, 684
Inclusion/mainstreaming, 685–686, 787
  See also Individualized Education Programs (IEP)
Incontinence, 686–688
Incredible Years Training Series, 965
Independent living, 688–689
Independent variable. *See* Experiment
Individual differences, 689–692
  core domains of, 690–691
  development of, 691–692
  prosocial behavior and, 1038–1039
  in short-term memory, 1168–1169
  summary on, 692
Individual Psychology, 27, 176, 177
Individualized Education Programs (IEP), 692–693
  inclusion/mainstreaming, 685–686, 787
  Individuals with Disabilities Education Act (IDEA) and, 425, 685, 694–695, 787
  See also School
Individuals with Disabilities Education Act (IDEA), 425, 685, 694–695, 786
  See also Individualized Education Programs (IEP)
Induced abortion. *See* Abortion
Inductive reasoning, 695–696
  See also Cognitive development
Infancy, 696–702
  birth defects and, 174–176
  birth weight, 178–179, 620, 666, 703
  categorization in, 228–229
  colic and, 287–288
  crawling and, 319–320
  crying and, 329–330, 768
  emotional development in, 456
  fetal medicine, 507–508
  historical perspectives on, 696–697
  peer relationships in, 978
  in perspective, 701–702
  physical growth and development in, 1002–1003
  postpartum depression and, 1011–1012
  scientific study of development, 192–193, 276, 697–701

sensory development in, 1144
smiling and, 1183–1185
sucking behaviors in, 1069, 1236–1237
See also Attachment
Infancy in Uganda (Ainsworth), 69
Infant development. *See* Infancy
Infant-directed speech. *See* Language development
Infant habituation, 598, 699
See also Habituation
Infant mortality, 702–707
ethnic disparities of, 703–704
ongoing challenges to, 703, 818
prevention of, 706
recent progress to, 702–703
stress and, 514, 624–625, 703, 704–706
See also Injuries
Infanticide, 707–708
Infants and Mothers (Brazelton), 192
Infectious diseases, 708–710
acquired immune deficiency syndrome (AIDS), 9–15, 264
fetus development and, 512–513
human immunodeficiency virus (HIV), 264, 658–660
See also Immune system
Infertility, 710–713
Information processing theory, 598, 713–715
See also Learning
Ingraham v. Wright (1977), 379
Ingvarsson, E. T., 1126
Inhelder, B., 530
Inhibitory control, 715–716
Injuries, 716–723
across the life span, 717–720
adolescents and, 721–722
adults and, 722
alcohol and, 720
beyond age 65 and, 722
infants/toddlers and, 720
summary on, 722–723
young children and, 720–721
Inner speech, 1034
Insecure attachment, 252–253
See also Attachment
Insomnia, 1181
Institute for Responsible Fatherhood and Family Revitalization, 340
Institute of Human Development (IHD), 167
Instrumental activities of daily living (IADLs), 15, 935
See also Activities of daily living (ADLs)
Instrumental aggression, 96
See also Aggression
Instrumental conditioning. *See* Operant conditioning
Insulin-dependent diabetes, 265, 370
See also Diabetes
Insurance, health, 610–612
Integrative skills, 30
See also Adolescence
Intellectual decline, 723–724
See also Older adulthood
Intellectual differences, 690
Intelligence, 724–727
Alfred Binet and, 171, 724, 735, 827
contemporary theories of, 725–726
creativity and, 320
crystallized intelligence, 279, 330–331, 838, 1326
emotional intelligence, 458–460
fluid intelligence, 330, 331, 528–529, 1326
giftedness and, 577–579, 866
IQ tests and, 735–737, 827, 828
mental age and, 827
multiple intelligences, 553, 725, 736, 864–871
sex differences in, 1150–1153
test interpretation, 725, 736, 912
Wechsler Adult Intelligence Scale (WAIS), 331, 736, 1318–1319
Wechsler Intelligence Scale for Children (WISC), 331, 725, 736, 1319–1320
Intelligence Quotient (IQ), 735, 912
See also IQ tests
Intelligence Reframed (Gardner), 552
Intercultural dating, 336–337
Intergenerational relationships, 727–728
See also Grandparents
Intergenerational Studies (IGS), 167–168
Internalization, 103, 302
International Association of Gerontology (IAG), 574
Internet, 728–731
Interpersonal conflict. *See* Conflict
Interpersonal psychotherapy (IPT), 100, 1012
Interpretive phenomenological analysis, 1059
Interracial dating, 336–337
Interracial marriages, 731–733
Interviews, 1057–1058
Intimacy, 733–734, 1338
See also Emotional development
Intrapersonal conflict. *See* Conflict
Intrauterine insemination (IUI), 711
Intrauterine (IUD) device, 307
Intrinsic motivation, 858
Ionizing radiation, 734–735
Iowa Test of Basic Skills (ITBS), 1217
IQ tests, 735–737, 827, 828, 912
See also Intelligence
Islam, 737–743
Islamic belief and practice, 739–741
Islamic law, 741–742
orthodoxy and heterodoxy in, 742–743
the Sirah, 738–739
See also Religion
Iwaniec, D., 501
Izard, C. E., 458, 1207

Jackson, H. J., 1067
Jacobson, B. P., 89
Jacobson, L., 1139
Jacquin, K. M., 994, 1309
James, L. E., 90
James, W., 669, 698, 1144
Janke, M., 728

Janssen, P. A., 639
Jarquin-Valdivia, A. A., 186
Jarvis, H., 402
Jason, L., 263
Jayashankar, L., 681
Jeffers, R., 919
Jelalian, E., 920
Jenner, E., 680
Jensen, A. R., 724
Jet lag, 267
Jeynes, W. H., 1206
Jimerson, S. R., 586, 1175
Johnson, D. J., 842
Johnson, L., 604
Johnson, R. W., 881
Johnson-Laird, P., 347
Johnson-Pynn, J. S., 861
Johnston, W. A., 416
Johnston-Robledo, I., 827
Joint custody, 745–747
  See also Divorce
Jones, S. C., 591
Jones, W. H., 797
Jonides, J., 1168
Josephus, F., 1238
Judaism, 747–754
  anti-semitism and, 101–103, 754
  belief system of, 748
  the Holocaust and, 635–637, 753
  holy days of, 749–750
  Jewish practice, 751–752
  lesser holidays of, 750–751
  modern denominations, 753
  sacred literature of, 748–749
  the synagogue, 752
  20th century and beyond, 753–754
  See also Religion
Jung, C, 440
Jurors. *See* Courtroom testimony
Jusezyk, P., 768
Juvenile delinquency, 754–756
Juvenile rheumatic-diseases (JRD), 1086–1087
Juvenile sex offenders, 1160–1161

Kagan, J., 698, 701
Kalman, M. B., 824
Kamo, Y., 495
Kamphaus, R. W., 725
Kanner, L., 116
Kaplan, J., 158
Kaposi's sarcoma (KS), 13
Kappen, C., 176
Karasek, R., 1332
Karchmer, R. A., 729
Karma, 205–206
Karnes, M., 846
Karver, M. S., 958
Kastenbaum, R., 166
Kauffman, S., 410
Kaufman, A. S., 331, 725
Kaufman, N., 331
Kaufman Adolescent and Adult Intelligence Test (KAIT), 331
Kaufman Assessment Battery for Children (K-ABC), 725
Kaye, L. W., 301
Kearsley, G., 382
Keeler, G., 1206
Keeney, T., 1118
Keeping Children and Families Safe Act, 238
Kegan, R., 440
Kegel exercises, 687, 825
Keil, F., 229
Keith, B., 1220
Keller, H., 765
Kelly, A., 562
Kelly, J., 617
Kelly, R. I., 683
Kelsey, J. L., 1206
Kennedy, A., 464
Kennison, S. M., 170
Kerestes, A., 601
Kerr, D. C. R., 302
Kerr-Mills Law, 821
Kervorkian, J., 121, 1088
Kessel, F. S., 202
Kibbutzim, 757–758
  See also Judaism
Kidney failure, 619
Kieras, D. E., 1168
Killias, M., 524
Kim, S. Y., 329
Kim, Y., 470
Kindergarten readiness, 758–759, 1114
King, K. J., 376
King, P. M., 374
Kinsey, A., 496
Kinsey, A. C., 642, 759
Kinsey Institute, 759–760
Kinsey Study, 180
Kinship adoption, 36
Kinship care, 532
  See also Foster care
Kirasic, K. C., 843
Kirby, J. R., 725
Kisthardt, M. K., 390
Kitchener, K. S., 374
Klahr, D., 714, 1026
Klein, F., 643
Klein, M., 441, 1240
Kleinsorge, C., 1323
Kliewer, W., 264
Klima, E., 771, 772
Klinefelter's syndrome, 760–761, 1083
Klinger, R. S., 789
Knowles, M., 449
Kocis, C. M., 826
Kodish, I. M., 61
Koeppe, R. A., 1168
Kogan, N., 267

Kohlberg, Lawrence (1929–1987), 761–762
formal operational period and, 530
gender identity and, 561, 564, 567
stages of moral development, 580–581, 849–851, 854, 1215–1216
See also Moral development
Kohut, H., 441, 1043
Kolzkamp, K., 16
Kraepelin, E., 1105
Krashen, S., 1128
Krueger, R. F., 1045
Kruger, D. J., 78, 334, 497, 909, 913
Krumboltz, J., 222
Kübler-Ross, Elisabeth (1926–2004), 164, 403, 762–763, 1213–1214
See also Stages of dying
Kuhn, D., 833
Kuhn, M., 592
Kunjayi, S. K., 1151
Kuo, M., 172
Kurnit, D. M., 993
Kuther, T. L., 456, 856, 1341
Kutner, L., 38, 1088

Labor, 765–766
Laboratory Temperament Assessment Battery, 1255
Lachman, M. E., 776
Lack, L. C., 268
Lamb, C., 805
Lane, K. K., 105
Lane, K. L., 496
Lange, L. J., 340, 538, 816
Langhinrichs, R., 338
Langhinrichsen-Rohling, J., 338
Langhout, R. D., 1059
Language acquisition device (LAD), 261, 766–767, 772
See also Chomsky, Noam (1928–)
Language development, 767–773
in adolescence, 29, 31, 32
American Sign Language (ASL) and, 86–87, 153, 342, 772
babbling, 151–153, 768
baby talk, 155
before birth, 767
building a vocabulary, 769–770
categorization and, 229
childhood bilingualism and, 168–169
Chomsky's theory on, 260–262, 290, 766, 772, 1289–1291
competence-performance distinction, 290–291
constructing sentences, 770–772
in early childhood, 276–278, 420–421, 1024–1025, 1273
echolalia and, 437–438
English as a Second Language (ESL) and, 465–468
hearing-impaired children, 772
listening abilities and, 768
mean length utterance (MLU), 819–820
nature vs. nurture, 772–773
phonological awareness and, 999–1000
private speech and, 1034–1036
second language acquisition and, 1128–1131
semantic development, 1140–1141
speaking abilities and, 768–769
stuttering and, 1235–1236
summary on, 773
universal grammar, 261, 766, 1025, 1288–1291
Language impairment, 362
Lansing, M. D., 370
Lassen, S. R., 756, 893
Later adulthood, 773–776
physical changes in, 773–774
psychological functioning in, 774–775
social factors in, 775–776
summary on, 776
wisdom in, 1325
See also Older adulthood
Later childhood, 457, 1003–1004
See also Adolescence
Latino Americans. *See* Hispanic Americans
Lau v. Nichol (1974), 169
Laud, C., 1104
Laughter, 1184
Laursen, B., 298
Lauterbur, P., 1233
LaVoie, D. J., 64
Law School Admission Test (LSAT), 1100
Lawton, M. P., 15
Layton, W. M., 993
Lazicki-Puddy, T., 507
Lead poisoning, 776–777
Leaper, C., 559, 562
Learned helplessness, 161, 358, 778–780
Learning, 780–786
classical conditioning and, 269–270, 700
cooperative method of, 309–310
habituation and, 597–600, 699
modeling and imitation, 785, 853, 1038
operant conditioning and, 111, 700, 782–785
principles and theories of, 785
problem solving and, 1026, 1036–1037
respondent conditioning and, 111, 780–782
teaching and, 785
See also Theories of development
Learning disabilities, 362, 786–788
causes of, 786–787
and the classroom, 787–788
consequences of, 786
dyslexia and, 416–418, 998, 1066
identification of, 787
intervention strategies, 787
Learning Games curriculum, 2
Leclere de Buffon, G., 1001
Lee, H., 172
Lee, J. E., 172
Lee, P. R., 822
Leevy, C. B., 1312
Leigh, I. W., 343
Leman, K., 176
Lemery, K. S., 1257
Lemkin, R., 636
Lemo, T., 190

Lenneberg, E. H., 169, 325, 766, 772
Lent, R. W., 222
Leont'ev, A., 16
Lepper, M. R., 859
Lerner, R. M., 306
Lesbians, 788–789
See also Homosexuality
Lesch-Nyhan syndrome, 789–790
Lester, B. M., 330
Leu, D., 729
Leu, D. J., Jr., 729
Leukemia, 215, 216, 264
See also Cancer
Levenson, R. W., 86
Leventhal, T., 1205
LeVine, R., 327
Levinson, B., 990
Levinson, D., 1264
Levitas, R., 1293
Levy, C., 688
Lewin, K., 293, 858
Lewis, M., 667, 698
Li, S., 1250
Li, Y., 1250
Liberatos, P., 1206
Lichtman, J. W., 326
Life expectancy, average, 149–150
Lifelong Learning Institutes (LLIs), 450
Liggett, L. A., 121
Lightner, C., 805
Lillard, A., 846
Linehan, M., 957
Lineups, photographic, 317
Link, B. G., 1206
Linn, M., 558
Lipps, T., 460
Literacy, 790–793, 1110–1111
See also Reading
Little, M. A., 105
Living wills, 38
Locke, John (1632–1704), 696, 793, 1246
Locomotion, 593–594
See also Gross motor development
Locus of control (LOC), 794–796
See also Theories of development
Loeb, S., 246
Loevinger, J., 443
Logic, 1124
Lohman, D. F., 725
Loneliness, 796–797
Long-term care, 935–936
Long-term memory, 799–801
Alzheimer's disease (AD) and, 79–81, 135, 354, 375, 395, 800, 934
amnesia and, 89–90
in later adulthood, 774
Longitudinal research, 797–799
Baltimore Longitudinal Study of Aging (BLSA), 156–157
Berkeley/Oakland longitudinal studies, 167–168
cohort studies, 286, 797
cross-cultural development, 326–329
cross-sectional research, 329
Framingham Heart Study, 537–538
gerontology study, 575–576
National Longitudinal Survey Child-Mother (NLSCM), 607
New York Longitudinal Study (NYLS), 905–907
NICHD Child Care Study, 907–909
Seattle Longitudinal Study (SLS), 799, 1127–1128
twin studies, 1282
Lopez, D. F., 1191
Lorenz, K. Z., 324, 325, 480, 681, 682
Loss (Bowlby), 185
Lott, B., 563
Louis, L. L., 527
Love, K., 1220, 1221
Loving v. Virginia (1967), 337, 731
Low birth weight (LBW), 801–804
causes and risk factors, 620, 666, 802, 818, 863
cost of, 802–803
developmental consequences of, 703, 803–804
frequency of, 802
lifestyle issues of, 802
neonatal intensive care unit, 802
policy implications of, 804
prevention and treatment of, 803
terminology of, 801–802
See also High-risk infants
Lubart, T. I., 866
Luecken, L. J., 199
Luria, A., 16
Lymphoma, 264
See also Cancer
Lyons, E. A., 1288
Lyons, N. P., 581
Lytton, H., 562

Ma, L., 306
Maccoby, E., 254, 255, 558, 566, 979, 1193
MacLean, W. E., 396
Macrosystems, 439
MADD (Mothers Against Drunk Driving), 805–806
See also Drunk driving
Maddox, G. L., 574
Madigan, A. L., 975
Madrigal, R. A., 1075
Magical thinking, 806–807
Magnetic resonance imaging (MRI), 417, 1233, 1234
Magnuson, K. A., 1205, 1206
Mahler, M., 1042
Mahoney, J. L., 48
Maikranz, J., 266
Main, M., 130, 131, 1223, 1224
Mainstreaming. *See* Inclusion/mainstreaming
Major depressive disorder (MDD), 356, 847
Malaguzzi, L., 1070
Malik, N. M., 810
Malley-Morrison, K., 446
Malnutrition, 807–808, 1006, 1320, 1321

Mammogram, 217
Manni, M., 536
Mansfield, P., 1233
Manuel, J. C., 259
Mara, C. M., 930
March, R., 24, 809, 963
Marcia, J. E., 1049
Marcus, L. M., 370
Marecek, J., 563
Mariani, A., 272
Marijuana, 808–809
  See also Drug abuse
Marital equity, 809–810
Markstrom, C. A., 889, 890
Markus, H., 561
Marriage, 810–813
  as an institution, 810–811
  cohabitation and, 284, 285, 1339–1340
  common law marriage, 288–289
  conclusion on, 812–813
  divorce and, 383–389, 1340
  dual-earner households and, 402
  extramarital sex, 496–497
  gay marriages, 554–557, 811
  interracial marriages, 731–733
  marital equity, 809–810
  marital quality, 812
  as a research topic, 811–812
Married Woman's Property Act, 384
Marsden, A. L., 789
Marsee, M. A., 293
Marshuetz, C., 1169
Martin, C. L., 561, 562, 566
Martin, J., 254, 255, 1193
Martin, J. N., 337
Martin, L. L., 1191
Martin, R. A., 660
Martinez, R. S., 686
Martins, R. K., 890
Marx, C., 16
Maslow, Abraham (1908–1970), 813–814, 1132
Mason, A., 363
Massachusetts Stubborn Child Act of 1654, 238
Massage therapy, 1276
Masse, L. N., 3, 985
Masseoud, F., 646, 1297
Masters, J. L., 936
Maternal and fetal medicine (MFM), 507–508
Maternal health, 814–817
  child health and, 816
  definitions of, 814
  indicators of, 814–816
  summary on, 816
  See also Pregnancy
Maternal morbidity, 815, 818
Maternal mortality, 814–815
  See also Infant mortality
Maternal phenylketonuria (MPKU), 817–818
Maternal smoking, 818–819
Maternal stress. *See* Stress
Maternity Center Association (MCA), 179
Matthews, L., 547
Matthysse, S., 993
Maturation, 360, 819
  See also Theories of development
Mayer, J., 458
Mayer, J. D., 459
Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), 459
Mayes, S., 1013
Mayeux, L., 977
Maynard, A. E., 328, 329
Mazur, A., 1259
McAnulty, R. D., 1165
McCammon, S., 1162
McClaren, E., 117
McClelland, J., 767
McClure, M., 648
McCormick, T. R., 763
McCulloch, B., 360
McCullough, M. A., 1146
McDermott, H., 275
McDonnel, A. C., 948
McElwain, N. L., 1274
McIntosh, I., 658
McKay, D., 373, 571, 926, 957, 995, 1187
McKenzie, I. K., 524
McKiernan, K., 571, 926, 957, 1187
McKinney, B. C., 61
McLanahan, S., 1219
McLaughlin, M., 850
McLoyd, V. C., 1205, 1207
McMahon, R. J., 964
McMillan, K., 1085
McNeil, D. W., 890
McRoy, R., 37
Mead, G. H., 441
Mead, M., 571, 1221
Mean length utterance (MLU), 819–820
  See also Language development
Measles-mumps-rubella (MMR) vaccine, 116, 148, 680
Measurement, 1060
Measuring Personality Adjustment in Children Nine to Thirteen Years of Age (Rogers), 1091
Media violence, 53
Medicaid Community-Based Attendant Services and Supports Act of 2003 (MiCASA), 689
Medical abortion, 6
Medical College Admission Test (MCAT), 1100
Medical neglect, 249
Medical specializations, 1032–1033
Medicare, 612, 650, 820–823
Medicare Catastrophic Coverage Act (MCCA) of 1988, 822
Medicare Prescription Drug, Improvement and Modernization Act (MMA) of 2003, 822
Medoff-Cooper, B., 1237
Meerdink, J. E., 1181

Meeting at the Crossroads: Women's Psychological and Girl's Development (Gilligan), 579
Mehler, J., 767
Meltzoff, A. N., 349, 673
Melver, C. D., 476
Melzak, R., 951, 952
Memory failure, 823–824
  Alzheimer's' disease (AD), 79–81, 135, 354, 375, 395, 800, 934
  amnesia and, 89–90, 800
  eyewitness testimony and, 316, 317, 502–503
  false memories and, 501–504
  in late adulthood, 774–775
  short-term memory and, 1167–1169
Menaghan, E. G., 1206
Menarche, 824–825, 826, 889, 1050
Mennin, D. S., 290
Menomini Morphophonemics (Bloomfield), 1289
Menopause, 474, 825–826, 837
  hormone-replacement therapy (HRT) and, 645–646, 648
  hot flashes and, 655–656
  menarche and, 824–825, 826
  ovulation and, 825, 826, 948–949
Menstruation, 824, 826–827, 1050
Mental age, 827
Mental retardation, 827–830
  assessment and diagnosis, 536, 828–829
  causes of, 830
  classification systems, 829, 830
  definition of, 362, 828
  terminology of, 827–828
Mentor, 830–831
Mercer, J., 1243
Mercy killing, 346, 482
Merkur, D., 889
Merseth, K. K., 327
Merzenich, M., 191
Messinger, D., 1185
Meta-analysis, 831–832, 1060
  See also Statistical significance
Metabolism, 374
Metacognition, 832–833
  See also Cognitive development
Methadone, 833–834
  See also Addiction
Methamphetamine (MA), 90–92, 398
Methylmercury, 834–835
Mexican Americans, 632–633
  See also Hispanic Americans
Meyer, D. E., 1168
Michalski, R. L., 161
Microsystems, 439
Middle adulthood, 835–842
  cognitive development in, 838–840
  Elderhostel programs and, 449–450
  physical development in, 836–838
  psychological development in, 840–841
  summary on, 841–842
  See also Older adulthood
Middle childhood
  cognitive development in, 29, 31, 32, 34, 277–278
  emotional development in, 457
  friendship in, 541–542
  parent-child relationships, 962–963
  peer interaction in, 980–981
Middle children, 177, 504
Middlemiss, W., 315
Midlife crisis, 841, 842–843
Midwife, 638, 843–844
Miller, A. C., 1168
Miller, B. D., 726
Miller, G. A., 713, 724
Miller, J., 820
Miller, L., 1219
Miller, L. B., 846
Miller, M., 792
Miller, S. A., 303
Miller, W. B., 306
Milling, L. S., 359
Mind, Self, and Society: From the Standpoint of a Social Behaviorist (Mead), 441
Mind in Society (Vygotsky), 1314
Mirror of Language: The Debate on Bilingualism (Kakuta), 769
Miscarriage, 844
  See also Pregnancy
Mister Rogers' Neighborhood, 1092
Mitchell, M. C., 1033
Mize, J. A., 213
Modeling and imitation, 785, 853, 1038
  See also Operant conditioning
Modern Language Aptitude Test (MLAT), 114
Moffitt, T., 368, 1256
Molnar, A. E., 1008
Money, J., 566
Monitoring the Future project, 172, 397
Montagnier, L., 13
Montessori, M., 844
Montessori method, 844–847
Mood disorders, 350, 847–848
Moon, S., 492
Moore, C. F., 378, 465, 735, 819, 835, 910, 990, 1009, 1020
Moore, D., 792
Moore, K. L., 325, 1200
Moore, M., 382
Moore, M. K., 673
Moore, T. R., 819
Moral development, 848–854
  Eisenberg's prosocial reasoning, 852
  empathy and, 461–463, 851–852, 1149
  Freud's theory of, 851
  Gilligan's theory of, 579, 580–582, 851
  Kohlberg's theory of, 580–581, 761–762, 849–851, 854, 1215–1216
  measurement of, 1216
  methods of moral education, 852–853
  parenting style and, 853–854
  Piaget's theory of, 848–849
  stages of, 1214–1216

Moral reasoning, 851, 854–856
conventional, 855
postconventional, 855
preconventional, 854–855
stages of, 855–856, 1337
summary on, 856
Morality. *See* Moral development
More, T., 1293
Morelli, C. A., 81
Morgan, A. W., 725
Morning sickness, 511, 1016
See also Pregnancy
Morrill Federal Land Grant of 1862, 627
Morris, B., 478
Morris, E. K., 1179, 1318
Mortality, 856–857
Moshman, D., 1247
Mothers Against Drunk Driving (MADD), 805–806
See also Drunk driving
Mothers Outside of Marriage (MOMs), 1177
Motivation, 857–860
Motor skills mastering, 860–861
See also Physical development and growth
Motor vehicle injuries. *See* Injuries
Mottarella, K. E., 51, 84, 244, 460, 813
Mourning. *See* Bereavement
Mozart effect, 861–862
MRI (magnetic resonance imaging), 417, 1233, 1234
MS (multiple sclerosis). *See* Multiple sclerosis (MS)
Mull, D., 1061
Mullins, L. L., 1087
Multiple births, 862–863
See also Twins
Multiple disabilities, 289–290
Multiple intelligences, 725, 736, 864–871
applied importance of, 869–870
assessment approaches, 866–868
comparison of models of, 868–869
conclusion on, 870–871
Gardner's theory of, 552–553, 725, 736, 865
overview of models of, 864–866
See also Intelligence
Multiple sclerosis (MS), 871–875, 876
cognitive deficits of, 874
course and somatic symptoms of, 872–873
epidemiological statistics on, 872
etiology of, 872
implications of, 874
neuropsychological impairment of, 873–874
pathology of, 871
psychological and psychiatric symptoms of, 873
treatment for, 874–875
Multiracial children, 732–733
Multisystemic therapy (MST), 352, 1160–1161
Multon, K. D., 226
Munchausen's syndrome, 239
Munsterberg, H., 114
Murdock, t., 1220, 1221
Myelin, 875–876
Myers, E. M., 289
Myers, M. D., 921
Myocardial infarction, 218
Myopia, 876–878, 1144

Nachtigall, R. D., 393
Nadeau, D., 6
Naglieri, J. A., 725
Nagy, M., 344
Nangle, D. W., 335
Narcolepsy, 1181
Narrative analysis, 1059
Narvaez, D., 853
National Abortion and Reproductive Rights Action League (NARAL/NY), 6
National Academy on an Aging Society (NAAS), 574
National Assessment of Educational Progress (NAEP), 791, 879–880
National Association for the Education of Young Children (NAEYC), 609, 758
National Association of Childbearing Centers (NACC), 180
National Association of Secondary School Principals (NASSP), 312
National Asthma Education and Prevention Program (NAEPP), 123
National Career Development Association (NCDA), 220, 224
National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 236
National Center for Educational Statistics (NCES), 880–881
National Center for Environmental Health (NCEH), 236
National Center for Fathering (NCF), 340
National Center for Health Statistics (NCHS), 236
National Center for HIV, STD, and TB Prevention (NCHSTP), 236
National Center for Infectious Diseases (NCID), 236
National Center for Injury Prevention and Control (NCIP), 236
National Center on Birth Defects and Developmental Disabilities (NCBDDD), 236
National Child Abuse Hotline, 243
National Childfree Association (NCA), 258
National Coalition Against Domestic Violence (NCADV), 391, 392
National Coalition of Anti-Violence Program, 392
National Council on Disability (NCD), 88
National Domestic Violence Hotline, 392
National Elder Abuse Incidence Study (NEAIS), 444
National Fatherhood Initiative (NFL), 507
National Federation of the Blind (NFB), 688
National Hospice and Palliative Care Organization (NHPCO), 650, 651
National Hospice Foundation (NHF), 650
National Hospice Study, 881–882
National Immunization Program (NIP), 236
National Institute for Occupational Safety and Health (NIOSH), 236
National Institute of Aging (NIA), 156
National Institute of Child Health and Human Development (NICHD), 882–883, 1028

National Institutes for Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development, 907–909
See also Longitudinal research
National Institutes of Health (NIH), 156
National Longitudinal Survey Child-Mother (NLSCM), 607
National Organization for Rare Disorders (NORD), 1250
National Organization for Victims Assistance (NOVA), 391
National Research Act of 1974, 476
National Retired Teachers Association (NRTA), 83
National Rifle Association (NRA), 520, 523
National Vaccine Injury Compensation Program (NVICP), 1296
National Vital Statistics Reports, 883
National Youth Risk Behavior Survey (YRBS), 721
Native Americans, 884–891
conclusions on, 890
current social and health issues, 885–886
demographic information, 884
historical considerations, 884–885
life span development, 888–890
psychological processes and issues, 407, 483, 886–888
strengths of, 890
Natural childbirth, 891–892
Natural disasters, 377–378
Natural family planning (NFP), 306, 307
Natural systems, dynamics of, 411–412
See also Dynamical systems
Naturalistic observation, 892–893
Nature-nurture, 893–899
development of organisms, 893–894
impact of experience, 895–896
individual differences and, 691–692
language development and, 772–773
products of genes, 894–895
summary on, 899
underlying the solution, 898–899
understanding the interplay, 896–898
See also Theories of development
Nature of Intelligence and the Principles of Cognition, The (Spearman), 724
Nature of the Self, The (Frondizi), 441
Nearsightedness, 876, 1144
Negative punishment, 1056
See also Punishment
Neglect. *See* Child neglect; Elder neglect
Negy, C., 635
Neighborhoods, 900–902
Neimeyer, R. A., 167, 346
Neisser, U., 724
Nelson, T. F., 172
Nelson, W. M., III, 97
Neonatal assessments, 621–622
Neonatal Behavioral Assessment Scale (NBAS), 192, 902–903
Neonatal intensive care unit (NICU), 621, 802, 1030
Neonatal Oral Motor Assessment Scale (NOMAS), 1236
Neonatal Resuscitation Program (NRP), 82
Neonate, 903–904
Neonaticide, 707
Neugarten, B., 267, 931
Neurotransmitters, 904–905, 1279
New York Longitudinal Study (NYLS), 905–907
See also Longitudinal research
Newacheck, P. W., 264
Newell, A., 714, 724
NICHD Child Care Study, 907–909
See also Longitudinal research
Nie, N., 730
Nissenbaum, M. S., 148
Nitschke, P., 484
No Child Left Behind Act (NCLB) of 2002, 237, 791, 792, 879
Noble savage, 909
Noel, A. M., 759
Noise, 909–910
See also Sensory development
Noland, J. S., 318
Nolen-Hoeksema, S., 779
Noll, J., 726
Nondeclarative memory, 800, 801
Norm-referenced tests, 323, 910–911, 1100
Normal curve (bell curve), 912
Normative solidarity, 65
Norms, 911, 912–913
Noronha, L. M., 271, 409
Norris, V., 110, 929, 953, 1153
Norton, A., 1219
Nugent, J. K., 192, 903
Nuremberg Code (1947), 475–476
Nursery (preschool), 913–916
effects of, 915
nature and extent of, 913–914
ongoing issues about, 915
origins of modern programs, 914
Nutrition, 375, 916–918
malnutrition, 807–808
nutritional health of U.S. children, 917
prenatal care and, 514–515
promoting good nutrition, 916–917, 1006
recommended intake, 916
role of parents, 917–918
See also Eating disorders
Nyswander, M., 834

Oakes, J. M., 1206
Oakland Growth Study (OGS), 167, 168
Oberlin College, 627
Obesity, 919–921
childhood, 917
exercise and, 489
outcome studies on, 921
pediatric, 917, 919–920
scope of the problem, 919
stroke and, 1230
treatment options for, 920
See also Nutrition
Object permanence, 921–922
See also Cognitive development

Observational learning, 922–924
See also Theories of development
Observations, 1058
Obsessive-compulsive disorder (OCD), 135, 924–927
Obstructive sleep apnea (OSA), 109–110
OCD (obsessive-compulsive disorder). *See* Obsessive-compulsive disorder (OCD)
O'Conner, T., 1220
O'Donnell, S. L., 617, 780, 1209
Oedipal complex, 450–452
See also Psychoanalytic theory
Ohr, P. S., 702
O'Laughlin, E., 823
Old-Age, Survivors, and Disability Insurance (OASDI) program, 1079, 1198
Older adulthood, 927–929
activities of daily living (ADLs), 15–16, 119, 933, 935
aging in, 59–64, 773
aging parents and, 64–66
aging well in, 66–68
assisted living and, 119–121
changes in social functioning, 928–929
cognitive changes in, 928
congregate housing and, 300–301
emotional changes in, 929
exercise and, 488
gerontology and, 574–576
grandparenting and, 586–591, 928
intellectual decline in, 723–724, 774–775
loneliness in, 796–797
long-term memory in, 801, 823
physical changes in, 927
sensory changes in, 927–928
theories of aging, 1261–1266
See also Very old age
Older Americans Act (OAA) of 1965, 930
Older Americans Resources and Services Instrument (OARS), 15
Older Workers Benefit Protection Act of 1990, 50, 51
Oldest old age, 930–936
assisted living and, 119–121
definitions of, 931
demographic projections of, 931–932
gender differences in, 932
housing and long-term care, 935–936
mortality of, 932–933
physical changes in, 933–934
psychological changes in, 934–935
summary on, 936
Oldham, A. L., 229
Olenchak, F. R., 283, 1210
Olfaction, 1182–1183
Olivo, L. S., 332, 613
Olivola, C. Y., 442
Olson, L., 790
Omnibus Anti-Drug Abuse Act of 1988, 806
On Death and Dying (Kübler-Ross), 403, 763, 1088
On-line colleges, 628
On the Origin of the Species (Darwin), 333
Only children, 177, 936–939
adult adjustment of, 939
cognitive development of, 504, 937
social interaction of, 937–939
Operant conditioning, 782–785, 939–942
extinction and, 495–496, 783–784
punishment and, 378, 784–785
reinforcement and, 783, 940–941, 1071–1073
See also Learning
Opportunistic infections (OIs), 9, 10
Oppositional defiant disorder (ODD), 350, 367, 942–943
Organ donors, 185
Organic amnesia, 90
Organization, 470
Orphans, 943–945
Osborne, D., 556
Osteoarthritis (OA), 945–946
Osteoporosis, 946–947
Otte, S. T., 61
Ovando, C., 1130
Ovulation, 825, 826, 948–949
Ovum, 1001
Owen, C. J., 831

Pain, 951–953
Palenchar, D. R., 1258
Palincsar, A., 833
Palliative care, 953–955
See also Death
Palmer, E. L., 1092
Panel studies. *See* Longitudinal research
Panic disorder (PD), 955–957
Panic disorder with agoraphobia (PDA), 955
Pap (papanicolaou) test, 217
Papanicolaou (Pap) test, 217
Papini, M. R., 270
Papousek, H., 700
Parallel play, 311, 978
Parasitic infections, 1166–1167
Parasuicide, 957–959
See also Suicide
Parault, S. J., 1141
Parcel, T. L., 1206
Parent-adolescent relationships, 32, 33
Parent-child interaction, 959–961
See also Parent-child relationships
Parent-child interaction therapy (PCIT), 964–965
Parent-child relationships, 961–964
in adolescence, 963
aggression and, 55–56
in early childhood, 962
in middle childhood, 962–963
new parents and young children, 961–962
in preschool years, 1027
summary on, 963
See also Parenting
Parent Management Training (PMT), 965–966

Parent training (PT), 964–966
Parental alienation syndrome (PAS), 248
Parenthood, 1340–1341
Parenting, 966–974
  challenges in, 972–973
  changing faces of parents, 967–969
  child rearing and, 251–257
  conclusion on, 973–974
  discipline practices, 378–380, 971–972
  gender differences and, 562
  by grandparents, 589–591
  intergenerational patterns in, 973
  maladaptive, 1039
  moral development and, 853–854
  promoting good nutrition and, 917–918
  significance of, 966–967
  styles and child outcomes, 145–147, 162, 253, 378, 969–971, 984, 1027, 1193–1194
  temperament and, 1256–1257
  through the stages of development, 969
Parenting styles. *See* Parenting
Parents, adoptive. *See* Adoption
Parents Anonymous, 974–975
Parents' Fair Share, 340
Parish, R., 153, 300, 1047
Park, C. L., 219
Park, S., 189
Parker, J. D., 459
Parkes, C. M., 164
Parkison's disease, 135, 354
Parsons, F., 220, 225
Parten, M., 978, 979
Partial-Birth Abortion Ban Act of 2003, 6
Partners Against Hate, 604
Passive euthanasia, 121, 482
  See also Euthanasia
Pasteur, L., 680
Patalano, A. L., 696
Paternal twins. *See* Identical twins
Pathway thinking, 644
Patrick, J. H., 66
Patterns of Attachment (Ainsworth), 1222
Patterns of Child Rearing (Sears), 1127
Patterson, G., 964
Pattison, E. M., 1214
Pavlo, I., 111, 780
Pavlovian conditioning, 269–270
Payne, R., 1332
Pearman, A., 776
Pediatric obesity, 917, 919–920
Pedophiles, 241
Pedrotti, J. T., 737
Peer harassment. *See* Peer victimization
Peer pressure, 975–977
  See also Social development
Peer Pressure Inventory (PPI), 977
Peer rejection, 56–57, 980–981, 1028
Peer relationships. *See* Peers
Peer victimization, 57, 211–213, 1122
Peers, 977–984
  attribution theory and, 144
  gender differences and, 562, 1195
  interactions in adolescence, 335–336, 981–983
  interactions in early childhood, 978–979
  interactions in middle childhood, 980–981
  relationships in infancy and toddlerhood, 978, 1027–1028
  during the school years, 1111, 1122
  social development and, 1194–1196
  summary on, 983
Pellegrini, S., 1143
Pellegrino, J. W., 724
Pemberton, J., 272
Pepper, C. M., 847
Perceptual ability, 1152–1153
Perimenopause, 825
Permissive parenting style, 146, 254, 984–985, 1193
  See also Child rearing
Perpetrators. *See* Sexual abuse
Perry, D. G., 564, 565, 567, 568
Perry, L. C., 568
Perry Preschool Project, 428–429, 608, 985
  See also Early intervention programs
Persaud, T. V. N., 325
Personal Attributes Questionnaire (PAQ), 92, 93
Personal Responsibility and Work Opportunity Reconciliation Act of 1996, 532, 1015
Personality differences, 690–691, 1255
Personality psychology, 858–859
Personality traits, 525–526, 1130
Perspective taking, 1037–1038
Pert, C., 200
Pervasive developmental disorder not otherwise specified (PDD-NOS), 988
Pervasive developmental disorders (PDDs), 986–989
  Asperger's syndrome, 116–118, 135, 987–988
  autistic disorder (autism), 147–149, 361, 370, 986, 1039
  childhood disintegrative disorder (CDD), 986–987
  not otherwise specified (PDD-NOS), 988
  Rett's disorder, 987
  treatment interventions, 988–989
Pesticides, 989–990
PET (positron emission tomography), 1009–1010, 1234
Peter, L. J., 665
Peter, W. W., 156
Petoskey, M. D., 725
Pets, 990–992
Pharmacotherapy, 104–105
Phelps, B. J., 599
Phenotype, 992–993
Phenylketonurai (PKU), 993–995
Phillips, D. A., 326, 1055
Phillips, L. R., 444
Phinney, J. S., 479
Phobias, 381, 995–996
  See also Anxiety disorders
Phonics, 996–999, 1066
Phonological awareness, 996, 999–1000, 1065
Photographic lineups, 317

Physical abuse, 238–239, 241, 444
See also Child abuse
Physical aggression, 103
See also Aggression
Physical development and growth, 1000–1007
in adolescence, 1004
conclusion on, 1007
in early childhood, 1003, 1023
the growth curve, 1001–1002
in infancy, 1002–1003
in later childhood, 1003–1004
measuring growth, 1005
motor skills mastering, 860–861
prenatal growth, 1000–1001
puberty and, 1051–1052, 1147
regulation of physical growth, 1005–1007
sex differences in, 1147
stages of, 1000–1005, 1115–1116
in young adulthood, 1335–1336
Physical exercise. *See* Exercise
Physical neglect, 239, 249
See also Child neglect; Elder neglect
Physical punishment. *See* Punishment
Physical restraint, 784
See also Punishment
Physician-assisted suicide (PAS), 38, 121, 346, 482
Piaget, Jean (1896–1980), 1007–1008
abstract reasoning and, 7, 8, 422
applied behavior analysis and, 111
assimilation and, 118
cognitive development and, 275, 276, 277, 1023, 1273
concrete operational period and, 291–292, 1116–1117
conservation and, 302–303
deductive/inductive reasoning and, 347, 695
deferred imitation and, 349
developmental changes and, 303, 360, 526–527
egocentrism and, 441–442, 1021–1022
empathy and, 461
equilibrium and, 7, 281, 293, 469, 471
formal operational period and, 529–530, 838
imitation and, 673, 674
infancy and, 697
magical thinking and, 807
moral development and, 848–849
sensorimotor period and, 276, 1034
See also Cognitive development
Pickering, K., 1220
Pill, birth control, 307
Pinderhughes, E., 36
Pinker, S., 202
Pitzer, D., 1293
PKU (phenylketonurai), 993–995
PL 94–142, 425, 694, 787, 804
PL 99–457, 804
PL 105–17 (IDEA), 425
PL 107–110 (No Child Left Behind Act), 237
Planned Parenthood v. Casey (1992), 5
Play development, 1028
Plessy v. Ferguson (1896), 41
Plomin, R., 617
Plumbo, M., 1085
PMS (premenstrual syndrome), 826, 1050–1051
Pneumocystis carinii pneumonia (PCP), 13
Point-of-service plans (POS), 611
Pole, M., 211
Polio vaccine, 680
Politikos, N. N., 113, 323, 1260
Polivy, J., 100
Pollutants, 1007
Polychlorinated biphenyls (PCBs), 1008–1009
Ponton, L. E., 969
Poole, T., 74, 262, 549, 1345
Popper, K., 1125
Porges, S., 701
Porter, C. A., 890
POS (point-of-service plans), 611
Positive punishment, 1056
See also Punishment
Positron emission tomography (PET), 1009–1010, 1234
Post, S. G., 461
Postconventional reasoning, 855
Postpartum depression, 815, 1010–1012
Postretirement employment, 1082–1083
See also Retirement
Posttraumatic stress disorder (PTSD), 1012–1014
battered woman syndrome (BWS) and, 160–161
breast cancer and, 196
etiology of, 1013
prevalence of, 1013
rape and, 1064
treatment for, 1013
Poverty, 1014–1016, 1251
causes of, 1014–1015
context of, 1015
impact on child well-being, 1015
incidences of, 1014
malnutrition and, 807–808
in single-parent families, 1174
social policy and intervention, 1015–1016
social security and, 1198
Powell, J. L., III, 491, 1254
PPO (preferred provider organizations), 611
Pratt, H. D., 35, 46, 140, 313
Preconventional reasoning, 854–855
Preferential looking, 699–700
Preferred provider organizations (PPO), 611
Pregnancy, 1016–1018
adolescent, 982–983
embryo and, 453–454, 508, 1001
fetus and, 508–515, 903, 1001
first trimester of, 1016–1017
fraternal twins and, 538–539
gamete and, 549–550
high-risk infants and, 620–626, 666
identical twins and, 666–667
maternal health and, 814–817
maternal phenylketonuria (MPKU) and, 817–818
maternal smoking and, 818–819

miscarriage and, 844
multiple births and, 862–863
natural childbirth, 891–892
ongoing challenges during, 703
second trimester of, 1017–1018
stress in, 514, 624–625, 703, 704–706
teenage pregnancy, 1155, 1164, 1250–1252
third trimester of, 1018
twins and, 1283–1285
ultrasound and, 1287–1288
zygote and, 508, 1345
See also Infancy
Premack, D., 1271
Premenstrual syndrome (PMS), 826, 1050–1051
Prenatal care, 514–515
See also Fetus
Prenatal development, 1018–1020
Prenatal growth, 1000–1001
Prenatal services, 625
Prenatal stress. *See* Stress
Preoperational thought, 1020–1022, 1024
See also Cognitive development
Preschool (nursery), 913–916
Preschool years, 1022–1029
cognitive development in, 1023–1026
physical development in, 1023
social development in, 1026–1029
summary on, 1029
See also Early childhood
Prescription drug abuse, 397, 512
See also Drug abuse
Preterm infants, 1029–1031
See also High-risk infants
Preventive medicine, 1031–1033
Pribram K. H., 724
Primary circular reactions, 1034
Principles of Humane Experimental Technique, The (Russell & Burch), 475
Private speech, 1034–1036
See also Language development
Problem solving, 1026, 1036–1037
See also Learning
Problem-solving skills training (PSST), 352
Proception, 306
Procháska, G., 1068
Project Follow Through, 606
Project Red Ribbon, 806
Pronin, E., 442
Prosocial behavior, 1037–1040, 1049, 1149
See also Social development
Prosocial reasoning, 852
Prostate cancer, 217, 1040–1041
See also Cancer
Proxy advance directives, 38
Pryor, R. G. L., 1332
Psycho-Educational Profile-Revised (PEP-R), 370
Psychoanalytic theory, 1041–1044, 1268
conscience and, 301–302
depression and, 357, 358
ego and, 440–441, 442
Electra and Oedipal complexes, 450–452, 567, 1042
Id and, 665–666
libidinal drive, 1041–1042
selfobject theory, 1043
separation-individuation theory, 1042–1043
superego and, 655, 1240–1241
Psychological amnesia, 90
Psychological stress. *See* Stress
Psychology and Industrial Efficiency (Scott), 114
Psychopathia Sexualis (von Krafft-Ebing), 642
Psychopathology, 1044–1046
approaches to classification, 1044–1045
approaches to studying, 1045
defining abnormal behavior, 1044
depression and, 356–359
developmental, 363–369
understanding comorbidity, 1045
Psychopharmacology, 1046–1047
Psychophysiology, 453
Psychosocial development, 1047–1050
Psychotherapy, 100, 104–105, 435
Puberty, 1050–1053
changing growth patterns, 1051–1052
primary sex characteristics, 889, 1050–1051
secondary sex characteristics, 1051
stages of, 31, 1050, 1147
testosterone and, 1258–1259
varying rates of development, 1052–1053
Public Health Practice Program Office (PHHPO), 236
Public institutions, first, 626–627
Public policy, 1053–1055
Puddy, R. W., 235
Puerto Ricans, 633–634
See also Hispanic Americans
Pungello, E. P., 2
Punishment, 378, 784–785, 1055–1056
See also Reinforcement
Purging. *See* Eating disorders

Qualitative methods, 1057–1060
See also Scientific methods
Qualities of Community Life (Barker & Schoggen), 159
Quantitative methods, 1060–1061
Quasi-experimental design, 1060–1061
See also Experiment
Quinceañera, 1062
Quinlan, K. A., 1088, 1089

Rabies vaccine, 680
Racial identity. *See* Ethnic identity
Rader, N., 1310
Radiation therapy, 195, 216
Ramby, S., 1162
Ramey, C. T., 1, 2, 3, 807
Ramey, S. L., 3
Ramos-Ford, V., 864
Rando, T., 165
Random sampling, 1095–1096

Rape, 338, 1063–1064
See also Violence
Rapid eye movement (REM) sleep, 1180
Rasmussen, K. L., 145, 236, 1062
Rasnake, L. K., 918
Raynor, H. A., 921
Readiness tests, 758, 1114
Reading, 1064–1066
cognitive processes in, 1064–1065
literacy and, 790, 1110
phonics instruction and, 996–999, 1066
research in, 1065–1066
summary on, 1066
whole language, 997, 1323–1324
See also School
Rebellon, C. J., 554
Reciprocal determinism, 1066–1068
Reeve, C. L., 692
Referential learning, 770
Reflective abstraction, 7, 471–472
See also Equilibration
Reflexes, 1068–1070
Babinski reflex, 153
breathing reflex, 199–200
sucking behaviors and, 1069, 1236
Reggio Emilia Childhood Program, 1070–1071
Reichler, R. J., 370
Reinforcement, 1071–1073
characteristics of, 783, 940–941, 1071–1072
positive and negative, 1071
schedules of, 1072
See also Operant conditioning
Reinforcers, 1071–1072
See also Reinforcement
Reis, S. M., 864, 866, 868
Reisenauer, C. D., 1145
Reiss, D., 617
Reissland, N., 577, 1034
Relational aggression, 96
See also Aggression
Relativism, 1336
Reliability, 1073–1074
See also Validity
Religion, 1074–1075
Bar/Bat Mitzvah, 158, 748
Buddhism, 203–210
Catholicism, 229–235
cultural factors in dying and, 405–406, 408–409, 485
gestational surrogacy and, 1242
Islam, 737–743
Judaism, 747–754
work and, 1328
REM (rapid eye movement) sleep, 1180
Renzulli, J. S., 864, 866, 868
Residential facilities, 533
Resiliency, 1075–1077
Respiratory syncytial virus (RSV), 679
Respondent conditioning, 111, 780–782
See also Learning
Rest, J., 582
Retention, 583–586, 1077–1078
Retinopathy of prematurity (ROP), 1299
Retirement, 1078–1083
American Association of Retired Persons (AARP), 49, 82–83, 586
factors related to decision to retire, 1079–1081
gender differences in, 1082
myths about, 1082
older adults and, 775
postretirement employment, 1082–1083
social security and, 1199
theories of retirement adjustment, 1081
trends in, 1078–1079
Retirement adjustment. *See* Retirement
Retrograde amnesia, 90
Rett's syndrome, 987, 1083–1084
Rewards controversy, 859–860
Rh factor, 1085–1086
Rheumatoid arthritis (RA), 1086–1087
Richards, J. E., 1310
Richards, M. M., 966
Richardson, E., 609
Richardson, E. D., 16
Richmond, J., 429
Richmond, J. B., 605
Right-to-die movement, 346, 1088–1090
See also Death with dignity
Riley, M. A., 516
Ritalin, 134, 1090–1091
See also Attention deficit hyperactivity disorder (ADHD)
Ritter, K. B., 178
Roberts, D. E., 530, 1167, 1252
Roberts, E., 688
Roberts, M. C., 76, 213, 235, 266, 437, 507, 715, 1013, 1033, 1254, 1323
Robertson, J., 127
Robinson, E. A., 964
Robinson, K. M., 286
Robinson, P. W., 1056
Roche, J. P., 335
Rodell, J., 669
Roe, A., 221
Roe v. Wade (1973), 5
Roentgen, W., 1232
Rogers, Carl (1902–1987), 1091–1092, 1132, 1133
Rogers, Fred (1928–2003), 1092–1093
Rogers, K. A., 1246
Role theory, 561
Role-theory framework, 1264–1265
Romney, D., 562
Roosevelt, E., 951
Roosevelt, T., 531, 1317
Root, M. P. P., 732
Rosenberg, B. J., 939
Rosenthal, R., 1139
Rosnov, D., 437, 715
Ross, E. R., 762
Rosselli, M., 355

Rossi, P. H., 1206
Roth, M. B., 1070
Roth-Wolf, M., 23
Rothbart, M. K., 1038
Rothblum, E. D., 789
Rotter, J., 794
Rotunda, R. J., 27
Rousseau, Jean Jacques (1712–1778), 696, 697, 909, 1270
Routman, R., 1323
Rovee-Collier, C., 700
Rowe, D. C., 1206
Rowling, J. K., 1335
Roy, K. M., 76
Ruban, L. M., 283, 871, 1210
Rubella (German measles), 1093–1094
  See also Teratogen
Ruble, D. N., 566
Rueter-Lorenz, P. A., 1168
Rumelhart, D., 767
Runco, M. A., 505, 1133
Russell, W., 475
Rutter, M., 364

Saaman, R. A., 1207
Saarni, C., 559
Sabin, A., 680
Sachs, B., 1249
Saelens, B. E., 920, 921
Saffran, E., 768
Salinas, M. F., 142
Salk, J., 680
Salkind, N. J., 83, 163, 329, 330, 360, 440, 452, 666, 808, 844, 1022, 1041, 1053, 1204, 1270
Salovey, P., 458, 459
Salthouse, T., 1261
Saltzman, A. L., 637
Same-sex marriage. *See* Gay marriages
Sampling, 1095–1096
Sander, C. E., 1216
Sandhoff disease, 1249
Sandwich generation, 66
Santhi, N., 174
Santos, L. R., 1272
Sargis, R. M., 115
SAT (Scholastic Aptitude Test), 113, 114, 1096–1102, 1218
Saunders, C., 650
Savage, K., 419
Savla, J., 728
Scaffolding, 1102–1103
Scammon, R., 1001
Scarr, S., 1282
Schaie, K. W., 1127, 1261
Scheibe, K. E., 669
Scheidt, D. M., 14
Schema, 8, 1103–1104
  See also Cognitive development
Scherba de Valenzuela, J., 291
Schiavo, M., 1088, 1089
Schizophrenia, 1104–1109
  current diagnostic criteria for, 1105–1106
  descriptive features of, 1105
  diagnostic origins of, 1105
  etiology of, 135, 1106–1107
  other considerations of, 1107
  prevalence and demographic factors, 1106
  role of the family and, 1107
  treatment for, 351, 1046, 1107–1108
Schneider, M. L., 1020
Schoff D'Eramo, K., 1207
Schoggen, P., 159
Scholastic Aptitude Test (SAT), 113, 114, 1096–1102, 1218
School, 1109–1111
  after-school programs (ASPs), 46–49
  bilingual education, 169–170
  charter schools, 236–237
  deaf children and, 342
  distance learning, 382–383
  dropouts, 1111–1114
  drug education, 398
  English as a Second Language (ESL) and, 465–468
  gender differences in, 557–558
  gifted education, 577–578
  grade retention, 583–586
  higher education, 626–629, 1098
  inclusion/mainstreaming, 685–686, 787
  Individualized Education Programs (IEP), 692–693
  Individuals with Disabilities Education Act (IDEA), 425, 685, 694–695, 786, 787
  Internet and, 729
  kindergarten readiness, 758–759
  literacy and, 790–793, 1110–1111
  Montessori education, 844–847
  nursery (preschool), 913–916
  reading and, 1064–1066
  Reggio Emilia Approach (REA), 1070–1071
  special needs children, 1209–1210
  teaching and learning, 785
School discipline, 378–379
School dropouts, 1111–1114
  costs of, 1113
  demographics of, 1112–1113
  frequency of, 1112
  programs to reduce rates, 1113
  summary on, 1113–1114
School readiness, 1114–1115
  See also Kindergarten readiness
School years, 1115–1124
  cognitive development during, 1116–1119
  emotional development/self-understanding during, 1119–1121
  physical development during, 1115–1116
  social development during, 1121–1123
  summary on, 1123
Schopler, E., 370
Schrick, B. H., 892
Schultz, D., 1207
Schultz, K. S., 1083
Schut, H., 165

Schwartz, C. B., 1039
Schwimmer, J. B., 920
Scientific methods, 1124–1126
  conclusion on, 1126
  experiment and, 355, 489–490
  experimental designs, 1125–1126
  experimental group, 490–491
  experimental method and, 491–492
  generalizability and, 568–569
  goals of science, 1124
  hypothesis and, 662–663, 1218
  methods of science, 1125
  qualitative and quantitative, 1057–1061
  systematic knowledge and, 1124–1125
Scinicariello, F., 710
Sclafani, J. D., 162, 248, 1050
Scott, J. P., 324, 325
Scott, W. D., 114
Scribner, L., 348
Sears, Robert (1870–1937), 1126–1127, 1269
Seashore Tests of Musical Ability (STMA), 114
Seattle Longitudinal Study (SLS), 799, 1127–1128
  See also Longitudinal research
Second language acquisition, 1128–1131
  facilitating factors, 1130–1131
  stages of, 1128–1130
  summary on, 1131
  See also Language development
Second Morrill Federal Land Grant Act of 1890, 627
Secondborn children, 177, 504
Secure attachment, 1131–1132, 1192
  See also Attachment
Seery, J., 1089
Segal, D. L., 1073, 1298
Seger, C. A., 801
Seguin, E., 394
Seibring, M., 172
Seifert, K. L., 915, 1111
Seizures, 468
Self-actualization, 1132–1133
Self-concept, 423, 1026–1027, 1133–1134, 1337
Self-control, 1049–1050
Self-efficacy, 157, 222, 1134–1137
Self-esteem, 559–560, 1120, 1136, 1137–1139
Self-fulfilling prophecy, 1139–1140
Self-governance, 1338
Self-injurious behaviors (SIBs), 789, 790
Self-worth, 1138
Selfobject theory, 1043
Seligman, M. E. P., 778
Semantic development, 1140–1141
  See also Language development
Semantic memory, 800
Sensation seeking, 1141–1142
Sensitive period, 1142–1143
  See also Development
Sensorimotor period, 7, 276, 1034
Sensory development, 1143–1146
Separate cultures theory, 561
Separation anxiety, 105, 1146–1147
  See also Attachment
Separation anxiety disorder (SAD), 107, 1146
Separation (Bowlby), 128, 185
Separation-individuation theory, 1042–1043
Sepulveda, S., 536
Serper, M., 1108
Sethi, A., 961
Sever, A. M., 485
Severy, L. J., 308
Sex chromosomes, 262
Sex differences, 1147–1154
  cognitive differences, 1150–1153
  conclusions on, 1153
  physical and health differences, 1147–1148
  social differences, 1148–1150
Sex education, 1154–1156
  Kinsey Institute and, 759–760
Sexual abuse, 1156–1162
  definitions of, 1156–1157
  impact and effects of, 1158–1159
  incidence/prevalence patterns of, 1157–1158
  interventions for the victim/survivor of, 1159–1160
  prevention of, 1161–1162
  treatment of perpetrators, 1160–1161
  See also Child abuse
Sexual activity, 337, 1162–1165, 1339
  See also Dating
Sexual differentiation, 646–647
Sexuality. *See* Bisexuality; Heterosexuality; Homosexuality
Sexually transmitted diseases (STDs), 306, 1165–1167, 1251
  acquired immune deficiency syndrome (AIDS), 9–15, 264
  bacterial infections as, 1166
  conclusion on, 1167
  human immunodeficiency virus (HIV), 264, 658–660
  parasitic infections as, 1166–1167
  sexual activity and, 337, 1164
  viral infections as, 1166
Shackelford, T. K., 160, 161, 1237
Shaken baby syndrome, 239
Shakespeare, W., 520
Shapiro, A., 572
Shared parental responsibility (SPR), 247–248
Shaw, G. L., 862
Sheiner, E., 179, 201, 766
Shelley-Tremblay, J., 453
Sheskin, J., 1260
Shewedel, A., 846
Shields, S., 559
Shock, N., 156
Shonkoff, J. P., 326
Shoptaugh, C. F., 88
Shore, C. M., 1244
Short-term memory, 799, 1167–1169
  amnesia and, 89–90
  central executive of, 1168
  development and, 1169
  individual differences in, 1168–1169
  in later adulthood, 774

in preschool years, 1025
storage of, 1168
summary and conclusions on, 1169
See also Memory failure
Shoulder dystocia, 179
Shyness, 1169–1171
Sibling rivalry. *See* Siblings
Siblings, 1171–1174, 1194
Sickle cell disease, 265
SIDS (sudden infant death syndrome), 818, 1237–1238
See also Infant mortality
Siegler, R., 1037
Sikorski, A. M., 188
Simian immunodeficiency virus (SIV), 658
Similarity-based categorization, 228
Simon, H. A., 714, 724
Simon, J. B., 695
Simon, T., 171, 735
Sims, P., 1178
Singer-Freeman, K. E., 292
Single-parent family, 1174–1175, 1176
Single parents, 36, 1175–1179
See also Divorce
Skin allergens, 75
See also Allergy
Skinner, B. F. (1904–1990), 261, 767, 1179–1180, 1290
See also Applied behavior analysis (ABA)
Skinner, M., 2
Slavery and work, 1327–1328
Slavin, K., 8
Slavin, R. E., 310
Sleep, 1180–1182
Sleep disorders, 109–110, 1181
Sleepwalking, 1181
Sleigh, M. J., 515
Slobin, D., 202
Smallpox vaccine, 680
Smell, 1182–1183
See also Sensory development
Smiling, 1183–1185
See also Infancy
Smith, E. E., 1168
Smith, J., 1205
Smith, L. M., 306
Smith, M., 363
Smith, T., 314, 1000
Smolucha, F. C., 827
Snow, R. E., 724, 725
Social and Ethical Interpretations in Mental Development (Baldwin), 441
Social anxiety disorder (SAD), 1185–1187
Social class, 1187–1190
assessment of, 1188–1189
correlates of, 1188
definitions of, 1188
socioeconomic status (SES) and, 1204–1208
study of children and, 1189–1190
summary on, 1190
Social cognition, 1190–1191
Social Contract, The (Rousseau), 909
Social development, 1191–1198
adult relationships and, 1196–1197
antisocial behavior and, 103–105
community effects of, 1197
gender differences in, 558–559, 1148–1150
grade retention and, 585
initial relationships, 1192–1193
parenting styles and, 1193–1194
peer pressure and, 975–977
peer relationships and, 977–984, 1194–1196
in preschool years, 1026–1029, 1273–1274
prosocial behavior and, 1037–1040, 1049, 1149
during the school years, 1121–1123
siblings and, 1194
smiling and, 1183–1185
See also Antisocial behavior
Social exchange theory, 1265
Social learning theory (SLT), 54, 157, 561, 794
Social psychological theory, 561
Social security, 1198–1200
Social Security Act of 1935, 1079
Social Security Act of 1965, 820
Social skills training, 358
Society for Research in Child Development (SRCD), 1200–1201
Society for the Prevention of Cruelty to Children (SPCC), 238
Sociobiology, 1201–1204
Sociodramatic play, 311
Socioeconomic status (SES), 1204–1208
Sociological theories of aging, 1264–1265
Soeng, M., 207
Solomon, J., 1223
Solomon, L. Z., 831
Some Thoughts on Education (Locke), 793
Somer, S., 376
Sontag, S., 267
Spanking, 311, 379, 1208–1209
Sparling, J., 2
Spatial ability, 558, 1150
Spearman, C., 528, 724, 726, 827, 864
Special needs children, 258–259, 1209–1210
Americans with Disabilities Act (ADA), 87–89, 224, 689
inclusion/mainstreaming of, 685–686, 787
Individualized Education Programs (IEP), 692–694
Individuals with Disabilities Education Act (IDEA) and, 425, 685, 694–695, 786
See also School
Specialized foster care, 533
Specific language impairment (SLI), 773
Speech/language impairment, 362
Spemann, H., 324
Spence, J. T., 92
Spence, M. J., 511, 767, 1310
Spencer, L., 1334
Spencer, S. M., 66
Sperm donors, 393
Spina bifida, 265, 362
Spirituality. *See* Religion

Spousal abuse, 445
See also Domestic violence
Sroufe, A., 130, 1185
Stages of development, 1210–1212
adolescence, 30–34
characteristics of stages, 1211–1212
definition of, 1211
development and, 359–360
early childhood, 419–425
embryo, 453–454, 508, 1001
emerging adulthood, 454–456
fetus, 508–515, 903
infancy, 696–702
middle adulthood, 835–842
nature-nurture, 893–899
older adulthood, 927–929
oldest old age, 930–936
preschool years, 1022–1029
summary on, 1212
Stages of dying, 1212–1214
See also Dying
Stages of moral development, 1214–1217
See also Moral development
Stagnation, 1049
Standardized testing, 1100, 1217–1218
Stanford-Binet Intelligence Scale, 171, 724, 736
Stanley, J. H., 1266
State anxiety, 106–107
State Children's Health Insurance Program (SCHIP), 612, 706
Stathis, G. M., 743
Statistical significance, 1218–1219
Statistics, 1060
Stay-at-home fathers, 507
STDs (sexually transmitted diseases). *See* Sexually transmitted diseases (STDs)
Steele, C., 737
Steele, M. M., 184
Steele, R. G., 184, 217, 332, 613, 796, 921, 966, 1132, 1320
Stehouwer, D. J., 519
Steil, J. M., 734
Stepfamilies, 1219–1221
See also Divorce
Stephan, J. F., 450
Stepsiblings, 1172
Sterilization, 307
Stern, W., 827
Sternberg, R. J., 725, 736, 864, 865–866, 867
Stewart, A., 177
Stewart, E. A., 1285
Stewart, P. K., 1132, 1320
Stillborn infants, 702
Stimuli, 781
Stockard, C. R., 324
Stokoe, W., 86
Stone, S. M., 480, 682, 924, 992
Storm and stress, 1221–1222
Strange situation, 1131, 1192, 1222–1225
correlates of, 1224
individual differences in, 129, 1223–1224
protocol of, 185, 1222–1223
See also Attachment
Stranger anxiety, 105, 1225–1226
Strassberg, D. S., 472
Straus, M., 1208
Strauss, A. L., 404, 405, 1213
Stress, 1226–1228
breast cancer and, 195–196
conceptualization of, 1226
effects on psychological and medical outcomes, 1227–1228
measuring and assessing, 1226–1227
in middle adulthood, 837–838
physical growth and, 1007
in pregnancy, 514, 624–625, 703, 704–706
summary on, 1228
Stricker, G., 591
Stroebe, M., 165
Stroebe, W., 165
Stroke, 1228–1232
cardiovascular disease and, 218–219, 299, 837
common symptoms of, 1230
controllable risk factors, 1230–1232
high blood pressure and, 619, 1230
Structural and functional brain imaging, 1232–1235
See also Brain development
Structural solidarity, 65
Structured Mediation in Divorce Settlement (Coogler), 389
Stuckey, J. E., 1207
Stumpf, J. L., 95
Stuttering, 1235–1236
See also Language development
Sucking behaviors, 1069, 1236–1237
See also Infancy
Sudden infant death syndrome (SIDS), 818, 1237–1238
See also Infant mortality
Sugarman, D. B., 334
Suicide, 1238–1240
assisted suicide, 121–122, 1088
causes of, 1239
cluster suicide, 270–271
history of, 1238
Native Americans and, 886
parasuicide, 957–959
physician-assisted suicide (PAS), 38, 121, 346, 482
prevention for, 1239–1240
science in, 1238–1239
Super, C., 327
Super, D., 221
Superego, 665, 1240–1241
See also Psychoanalytic theory
Surrogate mothers, 1241–1243
Survey of Objective Studies of Psychoanalytic Concepts, A (Sears), 1126
Survivor disorder theory, 161
Sussking, J., 1197
Sussman, A. L., 908, 1055
Sustained attention, 134
Swain, R. A., 192
Swickert, R., 1142

Swisher, R. R., 901
Symbolic play, 1243–1244
Symons, F. J., 326
Sympathy, 1038, 1049
Syphilis, 1166
Systematic Training for Effective Parenting, 27

T cells, 1245–1246
  See also Human immunodeficiency virus (HIV)
Tabula rasa, 793, 1246–1247
Tackett, J. L., 1045
Tajfel, H., 668
Taste, 1247–1249
  See also Sensory development
Tatsch, R., 309
Tauber, R. T., 1140
Tauer, J. M., 860
Tavis, C., 563
Tax Equity and Fiscal Responsibility Act of 1982, 881
Tay, W., 1249
Tay-Sachs disease, 1249–1250
Taylor, M., 673
TDDs (telecommunications devices for the deaf), 88
Teaching-Family Model (TFM), 352
Technological disasters, 377–378
Technology and work, 1329–1330
Teen Fathers Collaboration, 340
Teenage pregnancy, 1250–1252
  factors associated with, 1251–1252
  prevention of, 1164, 1252
  problems in, 1164, 1250–1251
  See also Adolescence
Telecommunications devices for the deaf (TDDs), 88
Television, 1252–1254, 1334
Temperament, 366, 456, 1038, 1255–1257
  attachment style, parenting, and future adjustment, 132, 255, 1256–1257
  dimensions of, 96, 1255
  genetic and environmental influences on, 1256
  measuring and assessing, 1255–1256
  personality distinctions and, 1255
  summary on, 1257
Tenenbaum, H. R., 562, 563
Tenney, P. R., 1240
Teratogen, 1008, 1257–1258
Terman, L., 735, 827, 864
Test of English as a Foreign Language (TOEFL), 468
Testosterone, 1258–1259
  See also Puberty
Thalassemia, 1259–1260
Thalen, E., 860
Thalidomide, 1260–1261
Theories of aggression. *See* Aggression
Theories of aging, 1261–1266
  biological theories, 1265–1266
  conclusions on, 1266
  psychological theories, 1262–1264
  sociological theories, 1264–1265
  See also Older adulthood
Theories of development, 1266–1271
  applied behavior analysis (ABA), 110–112, 148
  behavioral model, 1268–1269
  cognitive-developmental model, 1269–1270
  dynamical systems, 409–416
  ecological theory, 201, 438–440
  locus of control (LOC), 794–796
  maturational and biological models, 1266–1267
  nature-nurture, 893–899
  observational learning, 922–924
  operant conditioning, 111, 700, 782–785, 939–942
  psychoanalytic model, 1268
  See also Cognitive development
Theory of mind (ToM), 1024, 1117, 1271–1272
  See also Cognitive development
Therapeutic foster care, 532–533
  See also Foster care
Thomas, A., 255, 905, 1255
Thomas-Presswood, T., 1131
Thompson, A. L., 496
Thompson, E., 1219
Thoreau, H. D., 275
Thought and Language (Vygotsky), 1314
Thrill seekers, 603, 1141
Thurstone, L. L., 724, 726, 864
Tiger, J. H., 569
Tinbergen, N., 480, 682
Titchener, E. B., 460, 461
Toddlerhood, 1272–1274
  cognitive-linguistic development in, 1273
  physical development in, 1272
  social-emotional development in, 1273–1274
  See also Preschool years
Toileting training, 1274–1275
Tolman, W., 936
Tomasello, M., 349
Tomkiewicz, S., 1206
Torrance Test of Creative Thinking (TTCT), 321, 867
Torres-Harding, S., 263
Touch, 1275–1277
  effects on biology, 1276
  effects on cognition, 1276–1277
  effects on emotion and social interaction, 1277
  physiological underpinnings/physical dimensions of, 1275–1276
  See also Sensory development
Touchpoints (Brazelton), 192
Tourette's syndrome (TS), 1277–1280
Toxoplasmosis (toxo), 1280–1281
Trait-and-factor theory, 220
Trait anxiety, 106–107
Transitional Bilingual Education (TBE), 169–170
Transracial adoption, 36
Traumatic brain injury (TBI), 191, 362
Trentacosta, C. J., 458
Trottier, K., 100
Troyer, J. M., 1325
Truman, H. S., 215, 821
Tsao, S. D., 373, 995

Tuason, T. G., 73, 601, 1190
Tuchman, M., 683
Tumolo, J. M., 359
Turell, S. C., 684
Turk, D. C., 952
Turkheimer, E., 366
Twain, M., 597, 1095
Twin studies, 1281–1283
  See also Twins
Twins, 1283–1285
  explaining twin birth, 1284
  fraternal twins, 538–539
  identical twins, 666–667
  in the media, 1284–1285
  multiple births and, 862–863
  myths about, 1284
  summary on, 1285
  unique relationships and characteristics, 1285
  See also Pregnancy
Two-year colleges, 628
Type A personality, 218–219

Ulrich, S., 180
Ultrasound, 1287–1288
Umylny, L., 1207
Underage drinking. *See* MADD (Mothers Against Drunk Driving)
Unemployment, 1331–1332
United Nations Convention on the Rights of the Child (UNCRC), 259–260
Universal grammar, 261, 766, 1025, 1288–1291
  See also Language development
Urbina, S., 171, 331, 1218
Urinary incontinence, 686–688
U.S. Bureau of the Census, 1291–1293
U.S. Food and Drug Administration (FDA), 1296, 1297
Utopianism, 1293

Vaccination, 680, 1295–1297
  See also Immunizations
Vacco v. Quill, 121
Validity, 1297–1298
Vallacher, R. R., 1134
Valvular heart disease, 218
Van Wallendael, L. R., 663
Vandello, J. A., 857
Varni, J. W., 920
Vartanian, L. R., 670
Vasectomy, 307
Vaugelas, C. F., 1289
Vehicleborne transmission, 710
Velissaris, N. G., 1201
Verbal ability, 558, 1152
Verbal aggression, 103
  See also Aggression
Vernon, P. E., 724, 726
Very low birth weight (VLBW), 1298–1301
  complications and risks, 620, 666, 863, 1299
  developmental implications, 1299–1301
  survival and treatment, 1299
  See also High-risk infants
Very old age, 1301–1303
  See also Oldest old age
Victimization prevention programs, 1162
  See also Child abuse
Video games, 1303–1307
  children's use of, 1304
  origin/growth in video game industry, 1303–1304
  positive and negative effects of, 1304–1306
  summary on, 1306
Vigilance attention, 134
Vilack, T., 746
Villanueva, I., 946
Violence, 1307–1309
  effects of, 1308
  frequency of violent behaviors, 1307–1308
  prevention of, 1308–1309
  rape and, 338, 1063–1064
  summary on, 1309
  television and, 1253
  types of, 1307
  video games and, 1305–1306
  See also Firearms
Viral infections, 1166
Virtual higher education, 628
Vissing, Y., 258
Visual cliff, 1309–1310
Visual impairment, 362
Vitamin deficiency, 1310–1313
Vocational exploration, 1337
Vocational psychologists, 220
  See also Career development
Vocational Rehabilitation Act of 1973, 87
Vokes, T., 947
Volling, B. L., 1173
Voluntary active euthanasia (VAE), 483, 485
  See also Euthanasia
Volunteering, 1313–1314
Von Dijken, S., 185
Von Frisch, K., 480
Von Humboldt, W., 1289
Von Károlyi, C., 578, 864
Von Krafft-Egin, R., 642
Voting Rights Act of 1965, 41
Vygotsky, Lev (1896–1934), 1314–1315
  activity theory and, 16, 21, 22
  cognitive development and, 279, 1243
  private speech and, 1035
  scaffolding and, 1102
  zone of proximal development and, 22, 1314, 1343–1345

Waddington, C. H., 61, 1005
Wade, C., 1016
Wade, J. C., 806, 1236
Wadsworth, M. E., 369
Walk, R. D., 1309
Walker, L. J., 582
Walker-Barnes, C. J., 552

Wall, P. D., 951, 952
Wallace, C. S., 190
Wallerstein, J., 385, 387
War on Drugs, 398
Ward, J., 834
Ward, T. H., 875
Warner, K., 724
Washington, G., 499
Washington v. Glucksberg (1997), 121, 1088
Wasik, B. H., 2
Waterborne transmission, 710
Watson, John B. (1876–1958), 697, 700, 1317–1318
Watson, M. A., 345
Watt, N. F., 610
Way, E., 1103
Webster, A., 370
Webster, V., 370
Wechsler, H., 172
Wechsler Adult Intelligence Scale (WAIS), 331, 736, 1318–1319
  See also Intelligence
Wechsler Intelligence Scale for Children (WISC), 331, 725, 736, 1319–1320
Weekes-Shackelford, V. A., 160, 1237
Weight, 1320–1322
  BMI (body mass index) and, 183–184, 374, 919, 920, 1321
  consequences of significant loss or gain, 1320–1321
  dieting and, 374–377, 920
  focus on heath not, 1322
  "ideal" weight, 1321–1322
  See also Obesity
Weiner, B., 142
Weiner, D. L., 683
Weissman, D., 953
Well-baby checkups, 1322–1323
Wenner, J. A., 349
Wenzel, A., 1012
Werner, H., 304–305
Werth, J. L, Jr., 346, 485
Wertheimer, M., 813
Western Air Lines v. Criswell (1985), 50
Wewerka, S. S., 349
What Every Baby Knows (Brazelton), 192
Whiplash-shaken infant syndrome, 239
Whitaker, R. C., 920
White, G., 689
White, J. M., 322
White, M. G., 200
White, S., 158, 754
White-Campbell Psychological Birth Order Inventory, 176
White-Traut, R. C., 109
Whitehead, M. B., 1241
Whitten, S., 8, 309, 1061
Whole language, 997, 1323–1324
  See also Language development
Widoe, R. K., 890
Widowhood and widowerhood, 1324–1325
  See also Death
Wiener, A., 1085
Wildsoet, C. F., 877
Williams, D. R., 844
Williams, M., 846
Wilson, E. O., 414, 1201, 1203
Wilson, G. T., 173
Wilson, L. B., 989
Wilson, M. E., 238
Wilson, W. J., 900
Wing, L., 116
Winningham, R. G., 120
Winsler, A., 117, 147, 311, 438, 984, 1036, 1077, 1103, 1115, 1344
Wisdom, 1325–1327
Wittgenstein, L., 228, 440
Woehr, S. M., 586, 1175
Wohlfarth, T., 1204
Wolfgang, M., 641
Women, Infant, and Children (WIC) program, 917
Women's career development, 223–224
Women's college movement, 627
Women's Health Initiative (WHI), 646
Wong, M., 52
Wood, D. J., 1102
Woodcock, R. W., 725
Woodcock-Johnson Intelligence Test (WJIT III), 331
Woodcock-Johnson Tests of Cognitive Ability—Revised (WJ-R), 725
Woodrow-Lafield, K. A., 1292
Woodruff, G., 1271
Worden, W., 164, 165
Words and Things (Brown), 202
Work, 1327–1333
  conclusions on, 1332
  demography and, 1331
  formal and informal, 1330–1331
  religion and, 1328
  slavery and, 1327–1328
  specialization of, 1328–1329
  technology and, 1329–1330
  unemployment and, 1331–1332
Work adjustment theory (TWA), 221
Working memory, 1168–1169
  See also Long-term memory
World Health Organization (WHO), 237, 1297, 1333–1334
Wraparound services, 242
Wright, John C. (1933–2001), 582, 1334
Wright, N., 51
Wrobel, G. M., 37, 38
Wynn, K., 700

X-rays, 1232, 1257

Ybarra, G. J., 340, 816
Young adulthood, 1335–1341
  biological changes in, 1335–1336
  cognitive changes in, 1336–1337
  psychosocial changes in, 1337–1338
  social changes in, 1338–1341
  summary on, 1341
Young Unwed Fathers Project, 340

Youngest children, 177–178, 504
Your One Year Old (Ames), 89
Your Seven Year Old (Ames), 89

Zagummy, M. J., 400
Zautra, A. J., 946
Zenmore, S. E., 70
Zeskind, P. S., 330
Zesking, S., 807
Zevenbergen, A. A., 380
Zierten, E. A., 202
Zigler, E. F., 429, 605
Zionism, 102
Zone of proximal development (ZPD), 22, 1314, 1343–1345
Zygote, 508, 1345